

Task shifting, interprofessional  
collaboration and education  
in oral health care

**Jan Jaap Reinders**



# **Task shifting, interprofessional collaboration and education in oral health care**

Jan Jaap Reinders

This study was financially supported by:

- Hanze University of Applied Sciences Groningen
- University of Groningen
- Center of Dentistry and Oral Hygiene, University Medical Center Groningen



© Copyright:

No part of this book may be reproduced or transmitted in any form or by any means, without prior permission in writing by the author, or when appropriate, by the publishers of the publications.

Jan Jaap Reinders

Task shifting, interprofessional collaboration and education in oral health care

Dissertation University Groningen

Cover photography: Edwin van Keulen

Layout: Puur\*M Vorm & Idee

Production: Gildeprint-Enschede

ISBN: 978-94-034-0483-7 (Printed book)

ISBN: 978-94-034-0482-0 (Ebook)



university of  
 groningen

# **Task shifting, interprofessional collaboration and education in oral health care**

**PhD thesis**

to obtain the degree of PhD at the  
 University of Groningen  
 on the authority of the  
 Rector Magnificus Prof. dr. E. Sterken  
 and in accordance with  
 the decision by the College of Deans.

This thesis will be defended in public on

Monday 26 March 2018 at 12.45 hours

by

**Jan Jaap Reinders**

born on 4 November 1972  
 in Rotterdam

**Supervisors**

Prof. C.P. van der Schans

Prof. B. Stegenga

**Co-supervisor**

Dr. W.P. Krijnen

**Assessment Committee**

Prof. P. Brocklehurst

Prof. A.D.C. Jaarsma

Prof. J.L.N. Roodenburg

**Paranymphs**

Edwin van Keulen

Nick Jonkhout

**Voor mijn ouders**

Josephus Jacobus Reinders

Dienke Reinders-Benes

**mijn kinderen**

Tristan Willem Josephus Reinders

Arvid Marcus Doran Reinders

**en mijn vrouw**

Hendrique Reinders-Huisman

“Accepteer de dingen waar het lot je aan bindt, en hou van de mensen met wie het  
lot je samenbrengt, maar doe dat met heel je hart.”

- Marcus Aurelius -





## Voorwoord

“Er gaat niets boven Groningen” werd mij met de paplepel ingegeven. Onder dit motto ben ik opgegroeid. Om die reden heb ik mij, ongeacht waar ik woonde, altijd verbonden gevoeld met Groningen. Een binding die mij ook heeft teruggebracht in deze mooie en oude provincie. Daardoor is promoveren in het Groningse Academiegebouw voor mij dan ook extra betekenisvol. Hoewel ik geen Gronings spreek, voel ik me Groninger en ben ik daar trots op! Gronings zijn is een uiting van een sociale identiteit. Ik ben echter geboren in Rotterdam en heb in meerdere provincies gewoond: Zeeland, Zuid-Holland, Noord-Holland, Friesland en Groningen. Desondanks zie ik mezelf als Groninger, heb ik specifieke opvattingen over Groningen en ben ik aan Groningen gehecht. Deze identificatie wordt nog eens extra positief bekrachtigd door de geschiedenis van mijn familie. Mijn moeder stamt af van een Gronings geslacht van ruim 350 jaar oud. De Groningse wortels van mijn vaders familie zijn zelfs al meer dan 430 jaar oud. Beide families komen uit Groningen-stad en het omringende Gorecht. Wij zijn Groningers, waar we ook mogen zijn of wonen.

In mijn proefschrift heeft sociale identificatie uiteindelijk ook een essentiële rol gespeeld. Ik realiseer mij dat dit de sleutel is die de deur naar interprofessionele samenwerking kan openen. Door mijn onderzoek weet ik nu meer over sociale identiteit en heb ik tijdens mijn promotietraject ook leren beseffen hoe sterk sociale identificatie ons gedrag kan bepalen. Een sociale identiteit staat los van elk rationeel argument en motivatie door straf of beloning. Een sociale identiteit verenigt mensen. En daar waar mensen de handen ineen slaan, daar kunnen zij samen meer bereiken dan ieder voor zich.



## CONTENT

<b>Chapter 1</b>	General introduction	<b>11</b>
<b>Chapter 2</b>	Attitudes among dentists and dental hygienists towards extended scope and independent practice of dental hygienists <i>Published in International Dental Journal 2017, 67(1), 46-58.</i>	<b>29</b>
<b>Chapter 3</b>	Reasons that Dutch dentists and dental hygienists oppose or support an extended scope of practice for dental hygienists <i>Accepted for publication in Journal of Allied Health</i>	<b>59</b>
<b>Chapter 4</b>	Minor differences in occupational stereotypes between dental and dental hygiene students <i>Submitted</i>	<b>85</b>
<b>Chapter 5</b>	Effect of intergroup comparison of interprofessional interaction on hierarchy in mixed profession groups <i>Submitted</i>	<b>103</b>
<b>Chapter 6</b>	Perceived interprofessional task distribution after a mixed student group formation intervention <i>Published in Journal of Dental Education 2017, 81(4), 413-419.</i>	<b>125</b>
<b>Chapter 7</b>	Summary & general discussion	<b>141</b>
	Nederlandse samenvatting	<b>175</b>
	Dankwoord	<b>181</b>
	Curriculum Vitae	<b>191</b>
	SHARE and previous dissertations	<b>195</b>



# CHAPTER 1

---

General introduction

Task shifting has resulted in major changes in the position of the dental hygiene occupation that has been gradually developing into a profession since its establishment by Dr. Alfred C. Fones in 1913. He opened the first school of dental hygiene in Connecticut after developing the concept of a prevention specialist that he referred to as a “dental hygienist” (Fones, 1929). These individuals were first licensed and allowed to practice in Connecticut, which was the first state to allow prophylaxis treatment by a dental hygienist. However, dentists in Connecticut were concerned that the duties given to dental hygienists would lead to additional expanded functions that could become a threat to the economic interests of dentists (Haaland, 1999). Therefore, the state of Connecticut included the regulation of dental hygienists as one part of the Dental Practice Act in 1915. Dentists in other American states followed the Connecticut model with the regulation of dental hygienists becoming part of their own dental practice acts. Since then, the occupation of the dental hygienist has been regulated by dentists in most countries (Johnson, 2009).

Task shifting or skill-mix change between dentists and dental hygienists is implemented all over the world (Johnson, 2009) and may create interprofessional tensions or even polarize the relationship between these two professions (e.g., Adams, 2004; Knevel, Gussy, Farmer & Karimi, 2017; Northcott et al., 2013; Ross & Turner, 2015). Polarization is the tendency of a group to make decisions that are more extreme than the initial viewpoints of its members and can result in conflicting views between professional groups (Aronson, 2010). Persuasive argumentation and social comparison processes contribute to group polarization (Isenberg, 1986). It is a social-psychological response to the perceived threat to an individual’s interests, and a number of professionals perceive task shifting as a threat (Knevel et al., 2017). This polarization in professional groups can obstruct or limit task shifting and the utilization of the dental hygienist (Knevel et al., 2017; Kreindler et al., 2012).

It is normal that professions tend to protect their professional boundaries and that a professionalizing occupation such as the dental hygienist pursues a full professional status (Macdonald, 1995). An occupation is a profession when it has its own code of ethics, a single qualifying entry route and certification, a professional association, and monopolization of a particular market (Alvesson, 2000). The degree to which the latter characteristic applies to the dental hygienist primarily depends on national or state jurisdictions (Johnson, 2009). The protection of professional boundaries by a profession may complicate interprofessional collaboration as well as jeopardize patient safety and the provision of high quality patient care (Powell & Davies, 2012).

Interprofessional collaboration amongst professionals from different disciplines is a way to address fragmentation, discontinuity, and lack of receptiveness (Vliet Vlieland & Hazes, 1997). Health care fragmentation occurs when treatment is provided by single health care professionals and is not synchronized (Bodenheimer, Chen & Bennett, 2009). The problem

of discontinuity becomes visible in the culture, structure, and processes whereby the same patient is supported by different agencies in sometimes incompatible ways (Crawford, 2012). Communication between members of different professions, such as lack of receptiveness, can pose problems to patient safety (Tjia et al., 2009). The elimination of unhelpful boundary demarcations between professions and appropriate education and training are factors that promote the success of changing a skill-mix between professions (Sibbald, Shen & McBride, 2004). Even though task shifting could solve workforce shortages and other problems in the health care system (e.g., Brocklehurst & Macey, 2015; Crisp, 2011; Pereira, Bugalho, Bergstrom, Vaz, & Cotiro, 1996), the social-psychological impact of task shifting between dentists and dental hygienists is recognized but has not been thoroughly investigated (Bullock & Firmstone, 2011; Dyer & Robinson, 2008; Northcott et al., 2013). According to the World Dental Federation, “interprofessional collaboration and teamwork is increasingly recognized as a means of achieving higher quality care and enhancing the effectiveness and efficiency of services” (FDI, 2015).

### *1.1 Task shifting and requirements for its implementation*

Task shifting is defined as the rational redistribution of tasks among health workforce teams (World Health Organization, 2008). As contemporary healthcare systems need to be reorganized because the demand exceeds available resources (e.g., Glick et al., 2012; Huang & Finegold, 2013; Kandelman et al., 2012), many governments confront these challenges by implementing task shifting policies as an alternative approach to the organization of health care (Johnson, 2009). These policies enable sharing professional tasks between the original profession and members of other or new occupations or professions with varying degrees of autonomy (Sibbald et al., 2004). It is not known to what degree attitudes among dentists and dental hygienists differ towards an extended scope of dental hygiene practice than from an independent practice.

Several studies of task shifting suggest that appropriately trained substitute professionals are able to deliver at least an equal quality of care (Laurant et al., 2009; Dennis et al., 2009; Laurant et al., 2005; Sibbald et al., 2004). Studies also provide evidence that it can increase efficiency (Bailit, Beazoglou, DeVitto, McGowan & Myne-Joslin, 2012; Richardson, 1999), increase access to services (Bailit et al. 2012; Sibbald, Laurant & Scott, 2006; Campbell, 1996), save costs by reducing training time (Bailit et al. 2012; Thomas et al., 1999), and reduce salary costs (Bailit et al. 2012; Dierick-van Daele et al., 2010; Laurant et al., 2005). Even though task shifting has become increasingly common in medical professions, according to the World Dental Federation, the dental profession has been lagging in this respect (FDI, 2015).

Successful task shifting requires favorable conditions in order to be effective. However, suboptimal conditions do not necessarily mean that task shifting will not be successful. It means that the environment in which it is implemented is highly complex, and the right requirements for its effectiveness must be aligned (Brocklehurst & Macey, 2015). For instance,

incentives in remuneration systems influence the organization of inputs and production of outputs of dental teams (Brocklehurst et al., 2016). Certain financial incentives can obstruct collaboration and consequently influence treatment within oral health care organizations. Therefore, financial incentives and task shifting should be aligned and professional and social acceptability enhanced. Another example is the alignment of legal protection and liabilities related to task shifting (Colvin et al., 2013). An additional example is the influence of protectionism related to professional boundaries and the organizational environment on the reallocation of tasks which could plausibly hamper the cost-effectiveness of task shifting in practice (Niezen & Mathijssen, 2014). Established professions might try to prevent other professions from expanding their scope of practice and independent practice (e.g., Adams, 2004; Nancarrow & Borthwick, 2005; Norris, 2001; Northcott et al., 2013). These practices are both part of task shifting and can be affected by collaboration between dentists and dental hygienists (e.g., Hopcraft et al., 2008; Abelsen & Olsen, 2008; Northcott et al., 2013).

Interprofessional collaboration and task shifting are interconnected (Colvin et al., 2013), however, this relationship has not been thoroughly studied (Bullock & Firmstone, 2011; Capaciteitsorgaan, 2013). Dental hygienists have been underutilized in interprofessional collaboration, and the utilization that actually occurs has not been well studied (Swanson Jaeks, 2009). This underutilization could be explained by regulations that limit direct access to dental hygienists but also by the social and psychological impact of task shifting. This impact is reflected in the sometimes contradictory attitudes regarding this practice among dentists and dental hygienists (e.g., Blue et al., 2013; Catlett, 2016; Hopcraft et al., 2008). Attitudes towards task shifting are likely to be different depending on whether a profession is a giving or receiving party. Thus far, it is not known to what degree attitudes among dentists and dental hygienists differ regarding an extended scope of dental hygiene practice or those practices that are independent.

### *1.2 Motives to support or oppose task shifting*

It is unclear what issues are considered by dentists and dental hygienists when supporting or opposing task shifting. Their goals can be different depending on their professional position (e.g., Abelsen & Olsen, 2008; Ross & Turner, 2015; Turner, Ross & Ibbetson, 2011). Their attitudes and considerations can both obstruct or enhance it. Attitudes are encouraged by motivation (Piipari, Watt, Jaakkola, Liukkonen, & Nurmi, 2009) while motivation reflects goals that are internal representations of desired states (Austin & Vancouver, 1996). Without positive attitudes towards task shifting, it will be less likely that practitioners will change behaviors that facilitate it in clinical practice (Tuckman, 1999). The absence of motivation will produce a similar outcome: task shifting will rarely be facilitated in clinical practice. Without motivation, goal-directed behavior is nonexistent (Austin & Vancouver, 1996).



Negative economic motives of dentists to obstruct task shifting might not be justified but are understandable. When dentists believe they might lose control over economic resources, they experience an existential threat. The professional position of dentists was perceived to be threatened by the introduction of the dental hygienist, according to dentists in Connecticut (Fones, 1929; Haaland, 1999).

Quality of care can be an argument for limiting task shifting to the dental hygienist. However, no clear evidence exists that dental hygienists are a threat to patient safety and are not competent enough to autonomously treat their own patients. Moreover, several studies provide evidence that dental hygienists are competent professionals (e.g., Brocklehurst et al., 2016; DeAngelis & Goral, 2000; Dyer et al., 2014; Macey et al., 2015; Macey, Glenny & Brocklehurst, 2016). It is likely that several issues are involved when considering supporting or opposing task shifting.

### *1.3 Expectations, self-image and occupational stereotypes*

It is not clear to what degree self-image and occupational stereotypes of dentists and dental hygienists correspond with those of students before entering an interprofessional program. Supporting or opposing task shifting by dentists and dental hygienists could also be explained by role expectations which are sometimes based on a lack of knowledge among dentists with regard to changing the dental hygienist role (e.g., McComas & Inglehart, 2016; Moffat & Coates, 2011; Gillis & Parker, 1996; Knevel et al., 2017; Muroga, Tsuruta & Morio, 2015; Pervez, Kinney, Gwozdek, Farrell, & Inglehart, 2016). Dental hygiene is an emerging profession; however, occupational stereotypes change slowly (Lassonde & O'Brien, 2013; McLean & Kalin, 1994). In other words, some dentists still regard the dental hygienist as an auxiliary, which does not reflect the current and formal status of the dental hygienist in most countries. However, such perceptions do influence behavior and the willingness of dentists to share basic dental tasks. Stereotypes reflect expectations and beliefs about the characteristics of out-group members (Denmark, 2010; Fiske, 1998). Occupational stereotypes can also be based on gender (McLean & Kalin, 1994). The dental hygiene occupation is female-dominated while dentistry is male-dominated in most countries (e.g., Kitchener & Mertz, 2012; Luciak-Donsberger, 2003; Mariño, Barrow & Morgan, 2014). Gender stereotypes play a role in the social interaction between dentists and dental hygienists and can affect interprofessional collaboration (Inglehart, 2013). This becomes visible with status differences between men and women that are also related to the established order of the occupational status hierarchy within health care (Bell, Michalec & Arenson, 2014). Since the professional socialization of dental and dental hygiene students is often separate, mutual role expectations and occupational stereotypes among these students are sustained or can even be strengthened (Vanderbilt, Isringhausen & Bonwell, 2013).

The claim or disclaim, affirmation or disaffirmation of professional position, social characteristics, and gender can influence professional identities that guide professional behavior (Holmes, 2001; Hurd, 2010). Therefore, occupational stereotypes are more likely to continue to exist when uni-professional education is not complemented with interprofessional education (Freeth, Hammick, Reeves, Koppel, & Barr, 2005) and interfere with collaboration by impacting communication between groups (Barnes, Carpenter & Dickinson, 2000; Carpenter, 1995; Carpenter & Hewstone, 1996; Hean, MacLeod, Adams, & Humphris, 2006). Expectations regarding tasks, roles, and collaboration are learned by dentists and dental hygienists during their professional socialization which already occurs at the undergraduate level (Brim, 1968). The professional identity or self-image of students can be based on occupational stereotypes even before entering their future occupation (McLean & Kalin, 1994).

#### *1.4 Socialization, identity, task distribution and collaboration*

It is not clear whether facilitating professional identity formation related to interprofessionalism could enhance interprofessional task distribution and improve interprofessional collaboration. Interprofessional programs during undergraduate training can facilitate socialization between members of two or more professions (Olson & Bialocerkowski, 2014). Professional socialization is a social learning process during which skills, attitudes, and behaviors related to their professional role are learned (Blue, Phillips, Born, & Lopez, 2011). This socialization begins already at the 'anticipatory socialization phase' (Scholarios, Lockyer & Johnson, 2003). During this phase, individuals select their career based on the attitudes and expectations regarding their occupation of choice. The most influential people for making a career choice among dental hygiene students are dental hygienists, dentists, and mothers (Monson & Cooper, 2009). The career choice of dental students is mostly influenced by parents, dentists, and family members in a medical or dental profession (Anbuselvan et al., 2013). Therefore, professional socialization of dental and dental hygiene students begins before they have even entered their undergraduate training. Before and during undergraduate training, they observe dentists, dental hygienists, and members of the teaching staff (e.g., Ashar & Ahmad, 2014; Masella, 2006; Monson & Cooper, 2009). Thus, students learn their professional identity not just by the formal content of a curriculum but also by the informal and implicit influences of the teaching staff. This is known as the 'hidden curriculum' (Hafferty, 1998; Hafferty & Franks, 1994). This curriculum is defined by Lempp & Seale (2004) as "the set of influences that function at the level of organizational structure and culture including, for example, implicit rules to survive the institution such as customs, rituals, and taken for granted aspects". The potential negative influence of the hidden curriculum on interprofessional collaboration is even greater when a curriculum does not provide opportunities to counter-balance this with interprofessional contact between students (Freeth et al., 2005). The contact hypothesis or intergroup contact theory of Allport (1954) has been described as one of the best strategies to employ to improve intergroup relationships (Brown & Hewstone, 2005; Wright, 2009). The premise of his theory states that interpersonal contact is an effective way to reduce prejudice

between members of different groups (Allport, 1954). For this reason, the intergroup contact theory is one of the most popular theories applied in interprofessional education (Hean & Dickinson, 2005).

Another popular theory in interprofessional education is the social identity theory (Pecukonis, 2014). This theory, introduced by Tajfel and Turner (1979), describes how individuals categorize people or groups as in-group or out-group through a social categorization process (Turner, 1987; Turner & Reynolds, 2010; Tajfel & Turner, 1979). A defined sense of professional identity is created by a reciprocal and reinforcing relationship between experiences of professional inclusivity and social exclusivity (Weaver et al., 2011). A second theory in the social identity approach is the identity theory (Owens, Robinson & Smith-Lovin, 2010; Stets & Burke, 2000). The identity theory has been applied much less in interprofessional education compared to the social identity theory, however, it can be considered as being complementary. These two theories have different approaches to the social self but are hardly ever cross-referenced and seem to occupy separate realities (Hogg, Terry & White, 1995; Owens et al., 2010; Stets & Burke, 2000). The identity theory describes how stable and internalized social identities are formed and how these identities guide behavior (Owens et al., 2010). Thus, the identity theory is focused on the intrapersonal level in which individuals have several social identities between which they choose depending on the social situation or context. This becomes visible in the phenomenon of “identity mobility” which is the shift between social identities depending on social context and the motives of the actor (e.g., Finn, Garner & Sawdon, 2010; Ginsburg, Regehr & Lingard, 2003; Lingard, Garwood, Szauter, & Stern, 2001).

Strong professional identities may perpetuate hierarchical disciplinary boundaries (e.g., Fitzgerald & Teal, 2004; Langendyk, Hegazi, Cowin, Johnson, & Wilson, 2015). For this reason, several authors suggest that the formation of an interprofessional identity will enhance interprofessional collaboration (e.g., Hammick, Freeth, Copperman, & Goodsmann, 2009; Khalili et al., 2013; Langendyk et al., 2015). According to Hammick et al. (2009), an interprofessional identity consists of three components: knowledge with regard to appropriate professional actions, professional competence, and professional conduct (including appropriate attitudes and values). However, it is unclear whether it is separate from professional identity.

The construct of ‘interprofessional identity’ is relatively new, and it is not known whether this concerns a separate social identity or whether it is an integrated part of professional identity. According to the identity theory, an individual changes his identity preferences and corresponding behavior depending on a change in social context (Owens et al., 2010). If professional identity and interprofessional identity are separate and co-existing social identities, than one of them will be more salient than the other. Such salience hierarchy could interfere with effective professional performance. According to the social identity theory, a professional identity reflects a (psychological) distinctiveness between professional

in-groups and professional out-groups (Tajfel & Turner, 1979). Even though professional distinctiveness can frustrate interprofessional collaboration by drifting away from it, it also justifies interprofessional collaboration because of the complementary contributions of different disciplines. When there is no professional distinctiveness between different professions, there is no added value. Team members with no added value are redundant. It is for this reason that it is important to know the added value of others' professions (role, expertise, and competencies) and simultaneously shape one's own professional uniqueness as added value to the interprofessional team or alliance (Kasperski, 2000). Interprofessional collaboration facilitates a synergistic performance based on grouped knowledge and skills. Yet, the synergistic performance can be limited or even obstructed by intergroup processes. According to the paradox of Whittington (2003), professional identity seems to conflict with the principles of interprofessional collaboration because professional uniqueness contradicts the tendency to share with or be similar to other professions.

Profession-specific tasks are inherently related to role expectations and professional self-definition or professional identity (Caza & Creary, 2016; Chreim, Williams & Hinings, 2007; Hornby & Atkins 2000; Pirrie, Hamilton & Wilson, 1999). The manner in which individuals perceive their professional identity will influence their interpretations and actions in a work-related context (Chreim et al., 2007; Goodrick & Reay, 2011; Pratt, Rockmann & Kaufmann, 2006). In turn, a professional identity is constructed by social interaction (Bechky, 2011; Binder, 2007; Hallett et al., 2009). Thus, role expectations have a personal and interpersonal dimension (Ohlen & Segestebn, 1998). The interpersonal dimension becomes prominent in interactions between members of different professions. Interactions between dentists and dental hygienists can reflect a polarization caused by task shifting (Knevel et al., 2017), and occupational stereotypes change slowly (Beggs & Dolittle, 1993). This also includes stereotypical thoughts about scope of practice and corresponding competences. Perceptual differences regarding professional tasks and role expectations can enhance many uncertainties between and within professionals (Douglas & Ryman, 2003; Workman, 1996). When the formation of a professional identity that includes beliefs and commitment regarding interprofessional collaboration can be facilitated, it could also change perceptual differences regarding professional tasks and expectations. According to the World Dental Federation, interprofessional education must enable the oral health team to acquire a different mix of skills and competencies that are needed for interprofessional collaboration (FDI, 2015).

The purpose of this dissertation is to explore the social psychological impact of task shifting between dentists and dental hygienists and to develop and investigate the effect of an intervention that can enhance interprofessional task distribution and interprofessional collaboration by facilitating interprofessional team formation.

## Overview of studies

The purpose of the study of Chapter 2 is to compare attitudes of dentists and dental hygienists regarding an extended scope and independent dental hygiene practice.

The purpose of the study of Chapter 3 is to explore the reasons for the opinions of dentists and dental hygienists regarding an extended scope of dental hygiene practice and to explore profession related explanatory factors.

The purpose of the study of Chapter 4 is to determine to what degree student perceptions of dentist and dental hygienist occupational stereotypes (assertiveness, dominance, and respectfulness) are different and to what degree they identify with these occupational stereotypes. Additionally, the relationship between gender and occupational stereotypes is investigated.

The purpose of the study of Chapter 5 is to investigate whether intergroup comparison of interprofessional interaction can change the relative dominance of one profession (professional position) and reduce interprofessional hierarchy in mixed profession groups.

The purpose of the study of Chapter 6 is to investigate the perceived scope of practice of dental and dental hygiene students. Furthermore, to determine whether distinguished interprofessional task distribution can change with an educational intervention comprising the combination of group-based performance feedback, intergroup comparison, and intergroup competition between mixed profession groups.

## References

- Abelsen, B. & Olsen, J.A. (2008). Task division between dentists and dental hygienists in Norway. *Community Dentistry and Oral Epidemiology*, 36(6), 558-566.
- Adams, T.L. (2004). Inter-professional conflict and professionalization: dentistry and dental hygiene in Ontario. *Social Science & Medicine*, 58, 2243-2252.
- Allport, G.W. (1954). *The nature of prejudice*. Cambridge, MA: Perseus Books.
- Anbuselvan, G.P., Gokulnathan, S., Praburajan, V., Rajaraman, G., Kumar, S.S., & Thagavelu, A. (2013). A study among dental students regarding the factors influenced dental students to choose dentistry as career. *Journal of Pharmacy And Bioallied Sciences*, 5(1), S36-38.
- Alvesson, M. (2000). Social Identity and the Problem of Loyalty in Knowledge Intensive Companies. *Journal of Management Studies*, 27(8), 1101-1123.
- Aronson, E. (2010). *Social Psychology*. Upper Saddle River, NJ: Prentice Hall. Ashar, A. & Ahmad A. (2014). Developing professionalism: dental students' perspective. *Journal of the College of Physicians and Surgeons Pakistan*, 24(12), 902-907.
- Austin, J.T. & Vancouver, J.B. (1996). Goal constructs in psychology: Structure, process, and content. *Psychological Bulletin*, 120(3), 338-375.
- Bailit H.L., Beazoglou T.J., DeVitto J., McGowan, T., & Myne-Joslin, V. (2012). Impact of Dental Therapists on Productivity and Finances III. FQHC-Run. School-Based Dental Care Programs. *Journal of Dental Education*, 76 (8), 1077-1081.
- Barnes, D., Carpenter, J., & Dickinson, C. (2000). Interprofessional education for community mental health: Attitudes to community care and professional stereotypes. *Social Work Education*, 19, 565-583.
- Bechky, B.A. 2011. Making organizational theory work: Institutions, occupations, and negotiated orders. *Organization Science*, 22(5): 1157-1167.
- Beggs, J. & Dolittle, D. (1993). Perceptions now and then of occupational sex typing: A replication of Shinar's 1975 study. *Journal of Applied Social Psychology*, 23, 1435-1453.
- Bell, A.V., Michalec, B., & Arenson, C. (2014). The (stalled) progress of interprofessional collaboration: the role of gender. *Journal of Interprofessional Care*, 28(2), 98-102.
- Binder, A. (2007). For Love and Money: Organizations' Creative Responses to Multiple Environmental Logics. *Theory and Society*, 36, 547-571.
- Blue, C.M., Funkhouser, D.E., Riggs, S., Rindal, D.B., Worley, D., Pihlstrom, D.J., Benjamin, P., Gilbert, G.H., & National Dental PBRN Collaborative Group (2013). Utilization of nondentist providers and attitudes toward new provider models: findings from the National Dental Practice-Based Research Network. *Journal of Public Health Dentistry*, 73(3), 237-244.
- Blue, C., Phillips, R., Born, D., & Lopez, N. (2011). Beginning the socialization to a new workforce model: dental students' preliminary knowledge of and attitudes about the role of the dental therapist. *Journal of Dental Education*, . 2011 Nov;75(11):1465-75.

- Bodenheimer, T., Chen, E., & Bennett, H.D. (2009). Confronting the growing burden of chronic disease: can the U.S. health care workforce do the job? *Health Aff (Millwood)*, 28(1), 64-74.
- Borgatti, S. & Cross, R. (2003). A relational view of information seeking and learning in social networks. *Management Science*, 49, 432-445.
- Brim, O.G. Jr. (1968). Adult socialization. In Clausen, J.A. (Ed.), *Socialization and society*. (pp. 182-226). Boston: Little Brown.
- Brocklehurst, P., Birch, S., McDonald, R., Hill, H., O'Malley, L., Macey, R., & Tickle, M. (2016). Determining the optimal model for role substitution in NHS dental services in the UK: a mixed-methods study. *Health Services and Delivery Research*, 4(22).
- Brocklehurst, P. & Macey, R. (2015). Skill-mix in preventive dental practice--will it help address need in the future? *BMC Oral Health*, 15(1), S10.
- Brocklehurst, P., Pemberton, M.N., Macey, R., Cotton, C., Walsh, T., & Lewis, M. (2015). Comparative accuracy of different members of the dental team in detecting malignant and non-malignant oral lesions. *British Dental Journal*, 8;218(9): 525-529.
- Brown, R., & Hewstone, M. (2005). An integrative theory of intergroup contact. In M.P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 37, pp. 255-343). San Diego, CA: Elsevier Academic Press.
- Bullock, A. & Firmstone, V. (2011). A professional challenge: the development of skill-mix in UK primary care dentistry. *Health Services Management Research*, 24(4), 190-195.
- Campbell, J. (1996). The reported availability of general practitioners and the influence of practice list size. *British Journal of General Practice*, 46, 465-468.
- Carpenter, J. (1995). Interprofessional education for medical and nursing students: Evaluation of a programme. *Medical Education*, 29, 265-272.
- Carpenter, J. & Hewstone, M. (1996). Shared learning for doctors and social workers: Evaluation of a programme. *British Journal of Social Work*, 26, 239-257.
- Catlett, A. (2016). Attitudes of Dental Hygienists towards Independent Practice and Professional Autonomy. *Journal of Dental Hygiene*, 90(4), 249-256.
- Caza, B.B., & Creary, S. J. (2016). The construction of professional identity [Electronic version]. Retrieved December 27, 2016, from Cornell University, SHA School site: <http://scholarship.sha.cornell.edu/articles/878>
- Crawford, K. (2012). *Interprofessional collaboration in social work practice*. London: SAGE.
- Chreim, S., Williams, B.E., & Hinings, C.R. (2007). Interlevel Influences on the Reconstruction of Professional Role Identity. *Academy of Management Journal*, 50, 1515-1539.
- Crisp, N. (2011). Global health capacity and workforce development: turning the world upside down. *Infectious Disease Clinics of North America*, 25, 359-367.

- Colvin, C.J., De Heer, J., Winterton, L., Mellenkamp, M., Glenton, C., Noyes, J., Lewin, S., & Rashidian, A. (2013). A systematic review of qualitative evidence on barriers and facilitators to the implementation of task-shifting in midwifery services. *Midwifery*, epub.
- DeAngelis, S., Goral, V. (2000). Utilization of local anesthesia by Arkansas dental hygienists, and dentists' delegation/satisfaction relative to this function. *Journal of Dental Hygiene*, 74(3), 196-204.
- Denmark, F.L. (2010). Prejudice and Discrimination. In I.B. Weiner & W.E. Craighead (Eds.), *The Corsini Encyclopedia of Psychology*. Volume Three (4th Ed., pp 1277). Hoboken, N.J.: John Wiley.
- Dennis, S.M., May, J., Perkins, S., Zwar, N., Sibbald, B., & Hasan I. (2009). What evidence is there to support skill mix changes between GPs, pharmacists and practice nurses in the care of elderly people living in the community? *Australia and New Zealand Health Policy*, 6, 23.
- Dierick-van Daele, A.T., Steuten, L.M., Metsemakers, J.F., Derckx, E.W., Spreeuwenberg, C., & Vrijhoef, H.J. (2010). Economic evaluation of nurse practitioners versus GPs in treating common conditions. *British Journal of General Practice*, 60(570), e28-35.
- Douglas, T.J. & Ryman, J.A. (2003). Understanding competitive advantage in the general hospital industry: valuating strategic competencies. *Strategic Management Journal*, 24, 333-347.
- Dyer, T.A., Brocklehurst, P., Glenny, A.M., Davies, L., Tickle, M., Issac, A., & Robinson, P.G. (2014). Dental auxiliaries for dental care traditionally provided by dentists. *Cochrane Database of Systematic Reviews*, 20;(8), CD010076.
- Dyer, T.A. & Robinson P.G. (2008). Exploring the social acceptability of skill-mix in dentistry. *International Dental Journal*, 58(4), 173-180.
- FDI (2016). Optimal oral health through inter-professional education and collaborative practice. FDI World Dental Federation. Version 5.1. 2015. Available at: [http://www.fdiworldental.org/media/70740/collaborative-practice\\_digital.pdf](http://www.fdiworldental.org/media/70740/collaborative-practice_digital.pdf). Retrieved October 15, 2016.
- Finn, G., Garner, J., & Sawdon M. (2010). 'You're judged all the time!' Students' views on professionalism: a multicentre study. *Medical Education*, 44(8), 814-825.
- Fiske, S.T. (1998). Stereotyping, Prejudice, and Discrimination. In D.T. Gilbert, S.T. Fiske, & L. Gardner (Eds.), *The Handbook of Social Psychology*. (Vol. 2, 4th Ed., pp. 357). Boston, Mass.: McGraw-Hill.
- Fitzgerald, A. & Teal, G. (2004). Health reform, professional identity and occupational sub-cultures: the changing interprofessional relations between doctors and nurses. *Contemporary Nurse*, 16(1-2), 9-19.
- Fones, A.C. (1929). Origin and history of the dental hygienists movement. *Journal Dental Hygiene*, 3(3), 7.
- Freeth, D., Hammick, M., Reeves, S., Koppel, L., & Barr, H. (2005). *Effective interprofessional education: development, delivery and evaluation*. Oxford, UK: Blackwell.
- Gillis, M.V. & Praker ME. (1996). The professional socialization of dental hygienists: from dental auxiliary to professional colleague. *National Dental Association Journal*, 47(1), 7-13.



- Ginsburg, S., Regehr, G., & Lingard, L. (2003). To be and not to be: the paradox of the emerging professional stance. *Medical Education*, 37(4), 350-357.
- Glick, M., Monteiro da Silva, O., Seeberger, G.K., Xu, T., Pucca, G., Williams, D.M., Kess, S., Eiselé, J.L., & Séverin, T. (2012). FDI Vision 2020: shaping the future of oral health. *International Dental Journal*, 62(6), 278-291.
- Goodrick, E. & Reay, T. (2011). Constellations of Institutional Logics: Changes in the Professional Work of Pharmacists. *Work and Occupations*, 38, 275–302.
- Haaland, A. (1999). Mapping the literature of dental hygiene. *Bulletin of the Medical Library Association*, 87(3), 283-286.
- Hafferty, F.W. (1998). Beyond curriculum reform: confronting medicine's hidden curriculum. *Academic Medicine*, 73, 403–407.
- Hafferty, F.W. & Franks R. (1994). The hidden curriculum, ethics teaching, and the structure of medical education. *Academic Medicine*, 69, 861–871.
- Hallett, T., Shulman, D., Fine, G. A., & Adler, P. (2009). *Peopling organizations: The promise of classic symbolic interactionism for an inhabited institutionalism*. The Oxford Handbook of Sociology and Organization Studies: Classic Foundations.
- Hammick, M., Freeth, D., Copperman, J., & Goodsman, D. (2009). *Being Interprofessional*. Cambridge: Polity Press.
- Hean, S. & Dickinson C. (2005). The Contact Hypothesis: an exploration of its further potential in interprofessional education. *Journal Interprofessional Care*, 19(5), 480-491.
- Hean, S., MacLeod, C., Adams, K., & Humphris, D. (2006). Will opposites attract? Similarities and differences in students' perceptions of the stereotype profiles of other health and social care professional groups. *Journal of Interprofessional Care*, 20(2), 162–181.
- Hogg, M.A., Terry, D.J., White, K.M. (1995). A Tale of Two Theories: A Critical Comparison of Identity Theory with Social Identity Theory. *Social Psychology Quarterly*, 58(4), 255-269.
- Holmes, L. (2001). Reconsidering graduate employability: the graduate identity approach. *Quality in Higher Education*, 7, 111-120.
- Hopcraft, M., McNally, C., Ng, C., Pek, L., Pham, T.A., Phoon, W.L., Poursoltan, P., & Yu, W. (2008). Attitudes of the Victorian oral health workforce to the employment and scope of practice of dental hygienists. *Australian Dental Journal*, 53(1), 67-73.
- Hornby, S. & Atkins, J. (2000). *Collaborative Care. Interprofessional, Interagency and Interpersonal*. (Second Ed.), Oxford: Blackwell Science.
- Huang, E.S. & Finegold, K. (2013). Seven million Americans live in areas where demand for primary care may exceed supply by more than 10 percent. *Health Aff (Millwood)*, 32(3), 614-621.
- Hurd, E. (2010). Confessions of Belonging: My Emotional Journey as a Medical Translator. *Qualitative Inquiry*, 16(10), 783-791.
- Inglehart, M.R. (2013). Interactions between patients and dental care providers: does gender matter? *Dental Clinics of*

*North America*, 57(2), 357-370.

Isenberg, D.J. (1986). Group Polarization: A Critical Review and Meta-Analysis. *Journal of Personality and Social Psychology*, 50 (6), 1141–1151.

Johnson, P.M. (2009). International profiles of dental hygiene 1987 to 2006: a 21-nation comparative study. *International Dental Journal*, 59(2), 63-77.

Kandelman, D., Arpin, S., Baez, R.J., Baehni, P.C., & Petersen, P.E. (2012). Oral health care systems in developing and developed countries. *Periodontology 2000*, 60(1), 98-109.

Kasperski, M. (2000). Toronto, ON: Ontario College of Family Physicians; 2000. Implementation strategies: 'Collaboration in primary care – family doctors and nurse practitioners delivering shared care' Available from: <http://ocfp.on.ca/docs/public-policy-documents/implementation-strategies-collaboration-in-primary-care---family-doctors-nurse-practitioners-delivering-shared-care.pdf?sfvrsn=3> Retrieved December 28, 2016.

Khalili, H., Orchard, C., Laschinger, H.K., & Farah R. (2013). An interprofessional socialization framework for developing an interprofessional identity among health professions students. *Journal of Interprofessional Care*, 27(6), 448-453.

Kitchener, M & Mertz E. (2012). Professional projects and institutional change in healthcare: the case of American dentistry. *Social Science & Medicine*, 2012 Feb;74(3):372-80.

Knevel, R., Gussy, M.G., Farmer, J., & Karimi, L. (2017). Perception of Nepalese dental hygiene and dentistry students towards the dental hygienists profession. *International Journal of Dental Hygiene*, 15(3), 219-228.

Kreindler, S.A., Dowd, D.A., Dana Star N., & Gottschalk, T. (2012). Silos and social identity: the social identity approach as a framework for understanding and overcoming divisions in health care. *Milbank Quarterly*, 90(2), 347-374.

Langendyk, V., Hegazi, I., Cowin, L., Johnson, M., & Wilson I. (2015). Imagining alternative professional identities: reconfiguring professional boundaries between nursing students and medical students. *Academic Medicine*, 90(6), 732-737.

Lassonde, K. A., O'Brien, E. J. (2013). Occupational stereotypes: activation of male bias in a gender-neutral world. *J Appl Soc Psychol*, 43, 387–396.

Laurant, M., Harmsen, J., Wolersheims Grol, R., Faber, M., & Sibbald B. (2009). The impact of non physician clinicians: do they improve the quality and cost-effectiveness of health care services? *Medical Care Research and Review*, 66, 365.

Laurant, M., Reeves, D., Hermens, R., Braspenning, J., Grol, R., & Sibbald, B. (2005). Substitution of doctors by nurses in primary care. *The Cochrane Database of Systematic Reviews*, 5, CD001271.pub2

Lempp, H. & Seale C. (2004). The hidden curriculum in undergraduate medical education: qualitative study of medical students' perceptions of teaching. *British Medical Journal*, 329(7469), 770-773.

Lingard, L., Garwood, K., Szauder, K., & Stern, D. (2001). The rhetoric of rationalization: how students grapple with professional dilemmas. *Academic Medicine*, 76(10), 545-47.

Luciak-Donsberger, C. (2003). The effects of gender disparities on dental hygiene education and practice in Europe. *International Journal of Dental Hygiene*, 1(4), 195-212.

- Macdonald, K.M. (1995). *The Sociology of the Professions*. London: Sage.
- Macey, R., Glenny, A., Walsh, T., Tickle, M., Worthington, H., Ashley, J. & Brocklehurst, P. (2015). The efficacy of screening for common dental diseases by hygiene-therapists: a diagnostic test accuracy study. *Journal of Dental Research*, 94(3), 705-785.
- Macey, R., Glenny, A.M., Brocklehurst, P. (2016). Feasibility study: assessing the efficacy and social acceptability of using dental hygienist-therapists as front-line clinicians. *British Dental Journal*, 221(11), 717-721.
- Mariño, R.J., Barrow, S.L., Morgan, M.V. (2014). Australian/New Zealand Bachelor of Oral Health students: sociodemographics and career decisions. *European Journal of Dental Education*, 18(3), 180-186.
- Masella, R.S. (2006). The hidden curriculum: value added in dental education. *Journal of Dental Education*, 70(3), 279-283.
- McComas, M.J. & Inglehart, M.R. (2016). Dental, Dental Hygiene, and Graduate Students' and Faculty Perspectives on Dental Hygienists' Professional Role and the Potential Contribution of a Peer Teaching Program. *Journal of Dental Education*, 80(9), 1049-1061.
- McLean, H.M. & Kalin, R. (1994) Congruence between self-image and occupational stereotypes in students entering gender-dominated occupations. *Canadian Journal of Behavioural Science / Revue canadienne des sciences du comportement*, 26(1), 142-162.
- Moffat, S. & Coates, D. (2011). Attitudes of New Zealand dentists, dental specialists and dental students towards employing dual-trained Oral Health graduates. *British Dental Journal*, 211(8), E16.
- Monson, A.L. & Cooper B.R. (2009). Career influences and perceptions of pre-dental hygiene students. *Journal of Dental Hygiene*, 83(3):126-33.
- Muroga, R., Tsuruta, J. & Morio, I. (2015). Disparity in perception of the working condition of dental hygienists between dentists and dental hygiene students in Japan. *International Journal of Dental Hygiene*, 13(3), 213-221.
- Nancarrow, S.A. & Borthwick, A.M. (2005). Dynamic professional boundaries in the healthcare workforce. *Sociology of Health & Illness*, 27, 897-919.
- Niezen, M.G. & Mathijssen, J.J. (2014). Reframing professional boundaries in healthcare: a systematic review of facilitators and barriers to task reallocation from the domain of medicine to the nursing domain. *Health Policy*, 117(2), 151-169.
- Norris, P. (2001). How 'we' are different from 'them': occupational boundary maintenance in the treatment of musculo-skeletal problems. *Sociology of Health & Illness*, 23(1), 24-43.
- Northcott, A., Brocklehurst, P., Jerkovic-Cosic, K., Reinders, J.J., McDermott, I., & Tickle, M. (2013). Direct access: lessons learnt from the Netherlands. *British Dental Journal*, 215(12), 607-610.
- Ohlen, J., & Segestebn, K. (1998). The professional identity of the nurse: conceptanalysis and development. *Journal of Advanced Nursing*, 28(4), 720-727.
- Olson, R. & Bialocerkowski A. (2014). Interprofessional education in allied health: a systematic review. *Medical Education*,

48(3), 236-46.

- Owens, T.J., Robinson, D.T., & Smith-Lovin L. (2010). Three Faces of Identity. *Annual Review of Sociology*, 36, 477-499.
- Pecukonis, E. (2014). Interprofessional education: a theoretical orientation incorporating profession-centrism and social identity theory. *The Journal of Law, Medicine & Ethics*, 42(2), 60-64.
- Pereira, C., Bugalho, A., Bergstrom, S., Vaz, F., Cotiro, M.A. (1996). A comparative study of caesarean deliveries by assistant medical officers and obstetricians in Mozambique. *British Journal of Obstetrics and Gynaecology*, 103, 508-512.
- Pervez, A., Kinney, J.S., Gwozdek, A., Farrell, C.M., & Inglehart, M.R. (2016). Education About Dental Hygienists' Roles in Public Dental Prevention Programs: Dental and Dental Hygiene Students' and Faculty Members' and Dental Hygienists' Perspectives. *Journal of Dental Education*, 80(9), 1071-1081.
- Piipari, S.Y., Watt, A. Jaakkola, T., Liukkonen, J. & Nurmi, J. (2009). Relationship between physical education students' motivational profiles, enjoyment, state anxiety, and self-reported physical activity. *Journal of Sport Science and Medicine*, 8, 327-336.
- Pirrie, A., Hamilton, S. & Wilson, V. (1999). Multidisciplinary education: some issues and concerns. *Educational Research*, 41(3), 301-314.
- Powell, A.E. & Davies HT. (2012). The struggle to improve patient care in the face of professional boundaries. *Social Science & Medicine*, 75(5), 807-814.
- Pratt, M.G., Rockmann, K.W., & Kaufmann, J.B. (2006). Constructing Professional Identity: The Role of Work and Identity Learning Cycles in the Customization of Identity among Medical Residents. *Academy of Management Journal*, 49, 235-262.
- Richardson, M.S.C. (1999). Identifying, evaluating and implementing cost-effective skill mix. *Journal of Nurse Management*, 5, 265-70.
- Ross, M. & Turner, S. (2015). Direct access in the UK: what do dentists really think? *British Dental Journal*, 218(11), 641-647.
- Scholarios, D., Lockyer, C., Johnson, H. (2003). Anticipatory socialisation: the effect of recruitment and selection experiences on career expectations. *Career Development International*, 8(4), 182-197.
- Sibbald, B., Laurant, M., & Scott, A. (2006). Changing task profiles. In R.B. Saltman, A. Rico & W. Boerma (Eds.) *Primary Care in the Driver's Seat? Organizational Reform in European Primary Care*. (pp. 149-164). Maidenhead: Open University Press,
- Sibbald, B., Shen, J., McBride, A. (2004). Changing the skill-mix of the health care workforce. *Journal of Health Services Research and Policy*, 9(1), 28-38.
- Stets, J.E., Burke, P.J. (2000). Identity Theory and Social Identity Theory. *Social Psychology Quarterly*, 63(3), 224-237.
- Swanson Jaecks, K.M. (2009). Current perceptions of the role of dental hygienists in interdisciplinary collaboration. *Journal of Dental Hygiene*, 83(2), 84-91.
- Tajfel, H., & Turner, J.C. (1979). An integrative theory of intergroup conflict. In W.G.Austin, S.Worchel (Eds), *The Social Psychology of Intergroup Relations* (pp.33-47). Monterey, CA: Brooks-Cole.

- Thomas, L.H., Cullum, N.A., McColl, E., Rousseau, N., Soutter, J. & Steen, N. (1999). Guidelines in professions allied to medicine. *Cochrane Database of Systematic Reviews*, 1, CD000349.
- Tjia, J., Mazor, K.M., Field, T., Meterko, V., Spenard, A. & Gurwitz, J.H. (2009). Nurse-physician communication in the long-term care setting: perceived barriers and impact on patient safety. *Journal of Patient Safety*, 5(3), 145-152.
- Tuckman, B.W. (1999). *A tripartite model of motivation for achievement: Attitude/drive/strategy*. Paper presented at the annual meeting of the American Psychological Association, Boston.
- Turner, J.C. (1987). A Self-Categorization Theory. In J.C.Turner, M.A.Hogg, P.J.Oakes, S.D.Reicher, & M.S.Wetherell (Eds.). *Rediscovering the Social Group: A Self-Categorization Theory* (pp. 42-67). Oxford, UK: Blackwell.
- Turner, J.C. & Reynolds, K.J. (2010). The Story of Social Identity. In T.Postmes & N.R.Branscombe (Eds.), *Rediscovering Social Identity: Key Readings*. (pp. 13-32). New York: Psychological Press.
- Turner, S., Ross, M.K., Ibbetson, R.J. (2011). Dental hygienists and therapists: how much professional autonomy do they have? How much do they want? Results from a UK survey. *British Dental Journal*, 28;210(10), E16.
- Vanderbilt, A.A., Isringhausen, K.T., Bonwell, P.B. (2013). Interprofessional education: the inclusion of dental hygiene in health care within the United States - a call to action. *Advances in Medical Education and Practice*, 30(4), 227-229.
- Vliet Vlieland, T.P. & Hazes, J.M. (1997). Efficacy of multidisciplinary team care programs in rheumatoid arthritis. *Seminars in Arthritis and Rheumatism*, 27(2), 110-122.
- Weaver, R., Peters, K., Koch, J., & Wilson, I. (2011). 'Part of the team': professional identity and social exclusivity in medical students. *Medical Education*, 45(12), 1220-1229.
- Whittington, C. (2003). A model of collaboration. In J.Weinstein, C. Whittington & T. Leiba T (Eds.). *Collaboration in Social Work Practice*. (pp. 39-62). Londen: Jessica Kingsley, 2003.
- Workman, B.A. (1996). An investigation into how the health care assistants perceive their role as 'support workers' to the qualified staff. *Journal of Advanced Nursing*, 23(3), 612-619.
- World Health Organization (2008). Task Shifting: Rational Redistribution of Tasks Among Health Workforce Teams. Global Recommendations and Guidelines. World Health Organization, Geneva Switzerland; <http://www.who.int/healthsystems/TTR-TaskShifting.pdf>, Retrieved December 29, 2016.
- Wright, S. C. (2009). Cross-group contact effects. In S. Otten, T. Kessler & K. Sassenberg (Eds.), *Intergroup relations: The role of emotion and motivation*. (pp. 262-283). New York, NY: Psychology Press.



# CHAPTER 2

---

## Attitudes among dentists and dental hygienists towards extended scope and independent practice of dental hygienists

Jan Jaap Reinders

Wim P. Krijnen

Pieter Onclin

Cees P. van der Schans

Boudewijn Stegenga

Reinders, J.J., Krijnen, W.P., Onclin, P., Van der Schans, C.P., Stegenga, B. (2017).  
Attitudes among dentists and dental hygienists towards extended scope  
and independent practice of dental hygienists.  
*International Dental Journal*, 67(1), 46-58.

**Abstract**

Aims - Attitudes of dentists and dental hygienists towards extended scope and independent dental hygiene practice are described in several studies, but the results are heterogenous. The purpose of this systematic review is to compare attitudes of dentists and dental hygienists towards extended scope and independent dental hygiene practice.

Methods – PubMed, AMED and CINAHL were used to identify relevant studies by two independent assessors. Only quantitative studies reporting percentages of dentists and dental hygienists attitude towards extended scope and independent dental hygiene practice were included. The random effects model was used to synthesize possible heterogenous influences.

Results – Meta proportions with regard to a positive attitude towards extended scope of practice are for dentists 0.54 and for dental hygienists 0.81. Meta proportions of a positive attitude towards independent practice are for dentists 0.14 and dental hygienists 0.59. A meta analysis with regard to negative attitudes could only be performed on extended scope of practice but did not reveal a difference between the two professions. Outcomes of included studies regarding negative attitudes of dentists were homogeneous. A minority of dentists hold negative attitudes towards extended scope of dental hygiene practice. Study outcomes regarding negative attitudes of dental hygienists were heterogeneous.

Conclusions - Positive attitudes are present in a majority of dentists as well as dental hygienists with regard to extended scope of dental hygiene practice, while for independent dental hygiene practice this holds for a minority of dentists and a majority of dental hygienists.

**Introduction**

Dentists and dental hygienists are two of the most prominent professions within the community oral health care. Since its establishment in 1913 (Fones, 1934), the profession of dental hygiene has changed drastically (Johnson, 2009). New legislation has enabled an extended scope and independent dental hygiene practice in many different countries (e.g. Heuvel van der, Jongbloed-Zoet, & Eaton, 2006; Jongbloed-Zoet, Bol-van den Hil, La Rivière-Ilsen, & van der Sanden-Stoelinga, 2012; ADHA, 2016; EDHF, 2015; GDC, 2013; NBHW, 2005; MHWS, 2006; CED, 2014). Both policies are part of task shifting. The latter consists not only of rational distribution of tasks (extended scope of practice) between dentists and dental hygienists, but also independent practice. Extended scope of practice and independent practice may enhance efficiency (Harris & Sun, 2012; DeAngelis & Goral, 2000), reduce costs (Fortner, 2008), increase patient comfort (DeAngelis & Goral, 2000; Lobene, 1979), Sisty LePeau, Nielson Thompson & Lutjen, 1992), and make oral health care more accessible (Edgington & Pimlott, 2000).



However, attitudes towards extended dental hygiene scope and independent dental hygiene practice and potential differences in attitudes between professions are currently unclear.

Attitude is defined as “a psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor” (Eagly & Chaiken, 1999). A positive attitude of dentists and dental hygienists towards these policies is required for task shifting. Professional status, culture, and professionalization issues can provide cues to the expected directions and magnitude of attitudes towards professional change among dentists and dental hygienists (Macdonald, 1999; Plager & Conger, 2006; Swanson Jaecks, 2009; Tajfel, Brown & Turner, 1979; Brewer, 2003; Adams, 2004a). Several studies investigated attitudes of dentists and dental hygienists towards the extended scope of practice and independent practice of dental hygienists (Blue et al., 2013; Hopcraft et al., 2008; Abelsen, & Olsen, 2008). The findings are somewhat fragmentary and inconclusive. The purpose of this systematic review is to compare attitudes of dentists and dental hygienists towards extended scope and independent dental hygiene practice.

## Methods

### Criteria for considering studies for this review

Four criteria were applied to consider studies: types of studies, types of participants, types of interventions, and types of outcomes measures. All relevant cross-sectional surveys that focus on extended scope of dental hygiene practice or independent dental hygiene practice. In addition, all studies that provide information regarding attitudes regarding these two policies. Furthermore, no interventions were considered or included in this study. Finally, two types of outcome measures were relevant to our review: proportions of practitioners with a positive or negative attitude towards an extended scope of dental hygiene practice and proportions of practitioners with a positive or negative attitude towards an independent dental hygiene practice according to dentists and dental hygienists. A positive attitude is defined as an evaluation of an entity which is good, useful, has good qualities, or of which one is being certain or sure that it is correct or true (Oxford Dictionaries, 2015). A negative attitude is defined as the opposite of a positive attitude.

### Search methods for the identification of studies

In order to determine synonyms or related terminology of extended scope of practice and independent practice, the MeSH database was used. In addition, an exploratory literature search regarding synonyms or related terminology was conducted in PubMed with a Boolean search: tasks[All Fields] AND (“dentists”[MeSH Terms] OR “dentists”[All Fields]) AND (“dental hygienists”[MeSH Terms] OR (“dental”[All Fields] AND “hygienists”[All Fields]) OR “dental hygienists”[All Fields]) OR (“oral” [All Fields] AND “hygienist” [All Fields])

In order to overcome the problem of not identifying all relevant publications, the 'related articles' function in PubMed was used as replacement of a full search (Chang, Heskett & Davidson, 2006). This search function compares words from titles, abstracts, and MeSH headings assigned using a powerful word-weighted algorithm (Lin, & Wilbur, 2007). The first most relevant publication as found in the Boolean search was used as a starting point of the related articles search. The publication of Abelsen & Olsen (2008) was the first publication relevant to the purpose of this study. Next, the publications associated with the content of the Abelsen & Olsen (2008) study were identified with the related articles function in PubMed. Additionally, a search was performed in the following databases: AMED and CINAHL.

## **Data collection and analysis**

### **1. Selection of studies**

Two assessors (JJR, PO) independently screened all identified titles and excluded studies clearly not relevant to the topic. After title screening, agreement between the two independent assessors was calculated using the Cohen's Kappa coefficient (Cohen, 1960). According to Fleiss (1981) kappa values below 0.40 should be regarded as poor, those between 0.40 and 0.75 as fair to good, and those exceeding 0.75 as excellent agreement. Title screening was followed by a consensus meeting between the two assessors in order to make a final selection of titles. When in doubt, abstracts were screened in order to determine their relevance. Then, one assessor (JJR) screened all abstracts of the final list of titles to verify whether the corresponding studies were surveys measuring attitudes of dentists or dental hygienists.

Eligibility criteria were used (Table 1) for final selection of articles such as cross-sectional surveys reporting percentage or proportion of dental or dental hygiene practitioners with respect to positive or negative attitude towards expanded scope of practice or independent practice. Qualitative studies or those using attitude measures based on multiple aspects were excluded. The relevance of the final list of included studies was verified by the second assessor (PO).

**Table 1.**

Eligibility criteria for literature selection process

Inclusion	Exclusion
Name or synonym of profession or discipline (e.g. dentist, GDP, dental hygienist or ADHP)	Other oral health professions (e.g. dental therapist)
Terms related to scope of practice, direct access independent practice and/or interprofessional or interdisciplinary change	Perspectives from a policy point of view
Terms related to attitude or perception	Publication based on one or few opinions
Quantitative research method	Qualitative research method
Terms or words referring to professional relationship between dental hygienists and dentists	Publication language other than English or Dutch
Indices related to percentages	Continuing professional development
Subjects related to specific clinical issues	Only faculty members or teachers
Attitude measures regarding task shifting and/or independent practice	Specialized dentists or dental hygienists
Percentages of dental or dental hygiene practitioners with a positive or negative attitude towards task shifting and/or independent practice	Students
	Attitude measures which cannot discriminate between practitioners with a positive, neutral or negative attitude
	Attitude measures concerning multiple aspects

## 2. Quality assessment

The quality of the cross-sectional surveys was evaluated using the Effective Public Health Practice Project (EPHPP) quality assessment tool for quantitative studies (Thomas, Ciliska, Dobbins & Micucci, 2004). The EPHPP tool covers three categories relevant to survey studies: selection bias, study design, and data collection methods. Each category consists of several questions allowing one of three possible judgements: strong, moderate, or weak. These are summarized in an overall quality score: strong (no 'weak' ratings), moderate (one 'weak' rating), or weak (two or more 'weak' ratings).

## 3. Data management and analyses

From each study, the operationalization of attitude was extracted. Data reflecting attitude were extracted from eligible studies. Then, the percentages of dental and/or dental hygiene practitioners with a moderate to very positive or negative attitude were retrieved. In addition, country and region, sampling type, response rate, gender distribution of practitioners, and sample size were collected. In three studies only subgroups of dentists or dental hygienists were reported. From these studies aggregated proportions were calculated.

The proportion of positive or negative attitude may be influenced by cultural, economic and political climate causing random variance. For this reason the random effects model was used to synthesize possible heterogeneous influences, however, those from type of profession and year of publication are statistically tested. A descriptive overview of the results by forest plots is combined with statistical testing of effects after mixed model estimation (Knapp & Hartung, 2003). The forest plot (Viechtbauer, 2010) presents the number of respondents (dentists or dental hygienists) answering affirmative with regard to a positive or negative attitude towards an extended scope of dental hygiene practice. In addition, the proportion affirmative replies with its 95% confidence interval per study and the meta effect of the proportion of positive or negative attitudes estimated from the random effects model based on each profession. A meta-analysis was performed when at least two studies of each comparison group (dentists and dental hygienists) were available. A funnel plot was used to visually inspect indication of publication bias. The latter is unlikely when the largest studies are near the average while smaller studies are spread evenly on both sides of the average. This is also investigated by the regression test for funnel plot asymmetry when at least ten studies were available for analyses (Viechtbauer, 2010; Harbord, Egger & Sterne, 2006).

## Results

### Description of studies

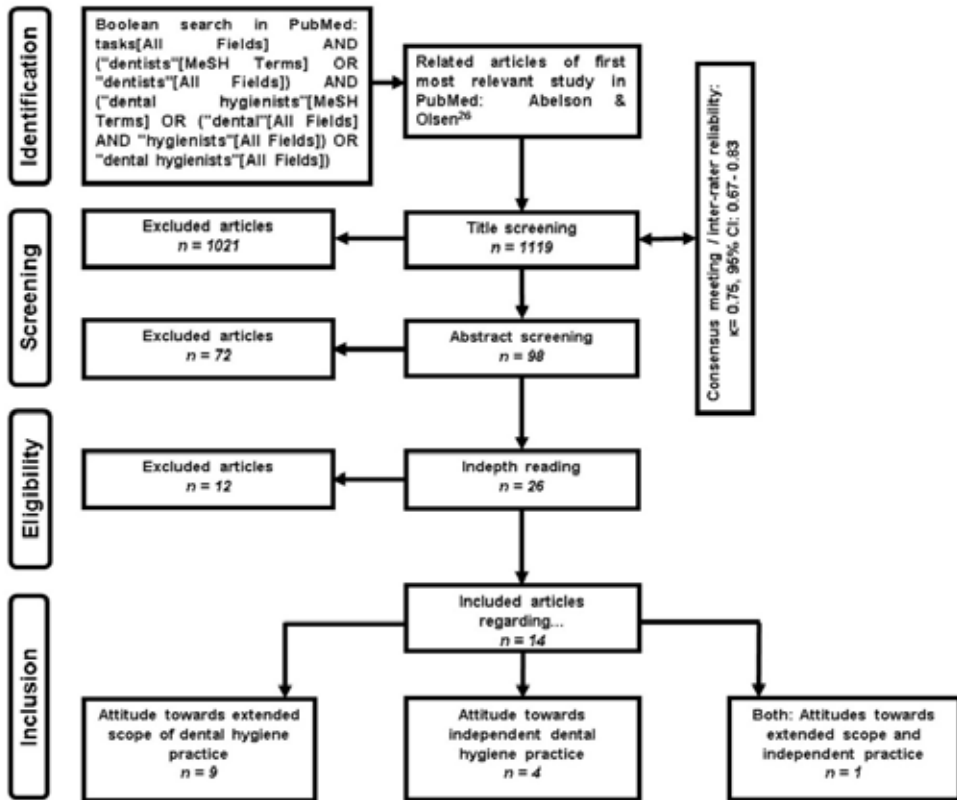
The exploratory literature search regarding synonyms or related terminology of task shifting resulted in the identification of seventeen different terms. The following terms were found,

besides extended scope of practice and independent practice: advanced hygienist skills (Brian, & Cooper, 1997), changing skill mix (Buchan, Ball & O'May, 2001; Falcon, 2010), changing task profiles (Petrén et al., 2005), maximized scope of practice (Christensen, 1995), expanding dental hygiene (Nash, 2009), expanded duties (Van Wyk, Toogood, Scholtz & Stander, 1998), expanded function (DeAngelis & Goral, 2000), task division (Abelsen, & Olsen, 2008), expanding the role (Bernie, 2001), task redistribution (Lecca, Valentine & Lyons, 2003; Jerković-Ćosić, Van Offenbeek & Van der Schans, 2012; Bruers, Van Rossum, Felling, Truin, & Van 't Hof, 2003), expanding the range of procedures (Ayers, Thomson, Rich & Newton, 2008), extended competencies (Corbey-Verheggen, 2001), task sharing (Widström, Eaton & Luciak-Donsberger, 2010), task shifting (WHO, 2006), task transfer (Kidd et al., 2006), work distribution (Wang, 2000), and task re-allocation (Nash, Friedman, Kavita & Mathu-Muju, 2012).

With the related articles search 1119 articles were identified in PubMed. In AMED and CINAHL no additional articles were found. The interrater reliability regarding title screening was Cohen's Kappa=0.75 (95% CI 0.67; 0.83). Twenty-six studies were selected by title screening among which fourteen studies (Blue et al., 2013; Hopcraft et al., 2008; Abelsen, & Olsen, 2008; Van Wyk et al., 1998; Adams, 2004b; Ayers, Meldrum, Thomson & Newton, 2006; Benicewicz & Metzger, 1989; Gordon & Rayner, 2004; Lambert, George, Curran, Lee, & Shugars, 2009; Moffat & Coates, 2011; Murtomaa & Haugejorden, 1987; Sgan-Cohen, Mann & Greene, 1985; Van Dam, Den Boer & Bruers, 2009) fulfilled the eligibility criteria (Figure 1). Reasons for excluding studies were as follows: One study only reported practitioners with a very positive attitude. Another study reported attitudes towards several specific tasks and not extended scope in general. Two studies reported specific motives regarding attitude towards extended scope of practice. In one study the attitude statement consisted of multiple aspects. Two studies described to what degree extended scope of practice was related to productivity. Three studies primarily focused on job or career satisfaction related to extended scope of practice. One study concerned attitude of dentists towards dental hygienists in general. One study focused on attitude towards interdisciplinary collaboration.

Figure 1.

Flow chart of the literature selection process



(Moher, Liberati, Tetzlaff, Altman &amp; The PRISMA Group, 2009)

The included studies were conducted on five different continents: North America (four from USA and one from Canada), Africa (two from South Africa), Oceania (two from New Zealand and one from Australia), Europe (Finland, Norway, and The Netherlands), and Asia (Israel; Table 2). It can be observed that the response rate of the studies varied between 29.0% and 87.5%. Eight out of fourteen studies reported a response rate higher than 60%. Sample sizes varied between 67 and 4522. Most sample sizes exceeded 300 participants. The oldest study was published in 1985 and the newest study in 2013.

Percentages of dentists with a positive attitude towards extended scope of dental hygiene practice are reported in six studies (Table 2). Percentages of dental hygienists were also reported in six studies. Percentages of dentists with a positive attitude towards independent dental hygiene practice were reported in four studies and in three studies of dental hygienists.

**Table 2.** Characteristics of studies included in the two meta-analyses regarding a positive attitude towards expanded scope and independent practice of dental hygienists

Positive attitude towards	Study and country (& region)	Sample type (& size)	Response rate (%)	Gender distribution in sample		Profession	Proportion practitioners with positive attitude	Operationalization of attitude
				Female	Male			
<b>extended scope</b>	Abelsen & Olsen, 2008, Norway	Random (453)	45.0%	39.0%		Dentist	0.60	'...desirable to delegate'
		Random (108)	42.0%	99.1%		Dental Hygienist	0.55	
	Ayers et al., 2006, New Zealand	Population (211)	73.2%	95.3%		Dental Hygienist	0.81	'Interested in expanding range of procedures'
	Blue et al., 2013, USA	Convenience (626)	76.3%	19.0%		Dentist	0.54	'...a positive impact on provision of quality dental care.'
	Gordon & Rayner, 2004, South Africa	Population (439)	51.0%	data not available		Dental Hygienist	0.93	'wish to expand on current qualification'
	Hopcraft et al., 2008, Australia (Victoria)	Random (183)	64.7%	15.6%		Dentist	0.62*	'Dental hygienists should be able to increase the scope of practice'
		Random (67)	77.0%	95.5%		Dental Hygienist	0.82	
	Lambert et al., 2009, USA (Colorado, Kentucky and North Carolina)	Stratified (389)	29.0%	97.3%**		Dental Hygienist	0.89**	'Overall level of support for' extended function dental hygienist
	Moffat & Coates, 2011, New Zealand	Random (330)	66.8%	30.4%		Dentist	0.59	'consider employing a dual-trained Oral Health graduate'

Positive attitude towards	Study and country (& region)	Sample type (& size)	Response rate (%)	Gender distribution in sample		Profession	Proportion practitioners with positive attitude	Operationalization of attitude
				Female				
<b>extended scope</b>	Murtomaa & Haugejorden, 1987, Finland	Random (313)	85.0%	65.6%		Dentist	0.69	'...changes in the tasks performed by Extended Duty Dental Hygienist'
	Sgan-Cohen et al., 1985, Israel	Convenience (156)	87.5%		data not available	Dentist	0.53***	'Expected functions of dental hygienist...'
<b>independence</b>	Van Wyk et al., 1998, South Africa	Random (138)	47.0%		data not available	Dental Hygienist	0.87	'functions of the oral hygienist should be expanded?'
	Adams, 2004 (54), Canada (Ontario)	Stratified (391)	62.0%	45.5%		Dentist	0.04	'Dental hygienists should be allowed to practice independently of dentists'
<b>independence</b>	Benicewicz & Metzger, 1989, USA	Stratified (383)	78.0%	88%		Dental Hygienists	0.71	
	Bonicewicz & Metzger, 1989, USA	Stratified (4522)	49.6%		data not available	Dental Hygienist	0.54	'...dentist's presence in the facility not always be required'
<b>independence</b>	Hopcraft et al., 2008, Australia (Victoria)	Random (183)	64.7%	15.6%		Dentist	0.27*	'Dental hygienists should be allowed to practice independently'
	Kaldenberg & Smith, 1990, USA (Oregon)	Random (67)	77.0%	95.5%		Dental Hygienist	0.52	
<b>independence</b>	Kaldenberg & Smith, 1990, USA (Oregon)	Random (385)	71.0%	5.4%		Dentists	0.10	'I support independent practice for hygienists'
	Van Dam et al., 2009, The Netherlands	Convenience (304)	45.9%	57.2		Dentist	0.67	'not afraid that the independent dental hygienist will become competitor of the dentist'

\*percentage aggregated over employer and nonemployer dentists / \*\*percentage aggregated over states / \*\*\*percentage aggregated over dental school faculty and dentists without any academic affiliation



Percentages of dentists with a negative attitude towards extended scope of dental hygiene practice were reported in three studies (Table 3). Percentages of dental hygienists were also reported in three studies. Percentages of dentists with a negative attitude towards independent dental hygiene practice were reported in three studies and in one study of dental hygienists.

**Table 3.** Characteristics of studies included in the two meta-analyses regarding a negative attitude towards expanded scope and independent practice of dental hygienists

Negative attitude towards	Study and country (& region)	Sample type (& size)	Response rate (%)	Gender distribution in sample		Profession	Proportion practitioners with negative attitude	Operationalization of attitude
				Female	Male			
extended scope	Abelsen & Olsen, 2008, Norway	random (453)	45.0%	39.0%		Dentist	0.40	'...desirable to delegate'
		random (108)	42.0%	99.1%		Dental Hygienist	0.45	
	Ayers et al., 2006, New Zealand	population (211)	73.2%	95.3%		Dental Hygienist	0.19	'Interested in expanding range of procedures'
		random (330)	66.8%	30.4%		Dentist	0.41	'consider employing a dual-trained Oral Health graduate'
	Murtomaa & Haugejorden, 1987, Finland	random (313)	85.0%	65.6%		Dentist	0.31	'...changes in the tasks performed by Extended Duty Dental Hygienist'
		random (138)	47.0%	data not available		Dental Hygienist	0.04	'functions of the oral hygienist should be expanded?'
independence	Adams, 2004b, Canada (Ontario)	stratified (391)	62.0%	45.5%		Dentist	0.96	'Dental hygienists should be allowed to practice independently of dentists'
		stratified (383)	78.0%	88%		Dental Hygienists	0.29	
	Kaldenberg & Smith, 1990, USA (Oregon)	random (385)	71.0%	5.4%		Dentists	0.82	'I support independent practice for hygienists'
		convenience (304)	45.9%	57.2%		Dentist	0.16	'not afraid that the independent dental hygienist will become competitor of the dentist'

\*percentage aggregated over employer and nonemployer dentists / \*\*percentage aggregated over states / \*\*\*percentage aggregated over dental school faculty and dentists without any academic affiliation

### Risk of bias among included studies

Three out of fourteen included studies were classified as 'weak' (Table 4) due to non-randomized sampling and potential selection bias.

**Table 4.**

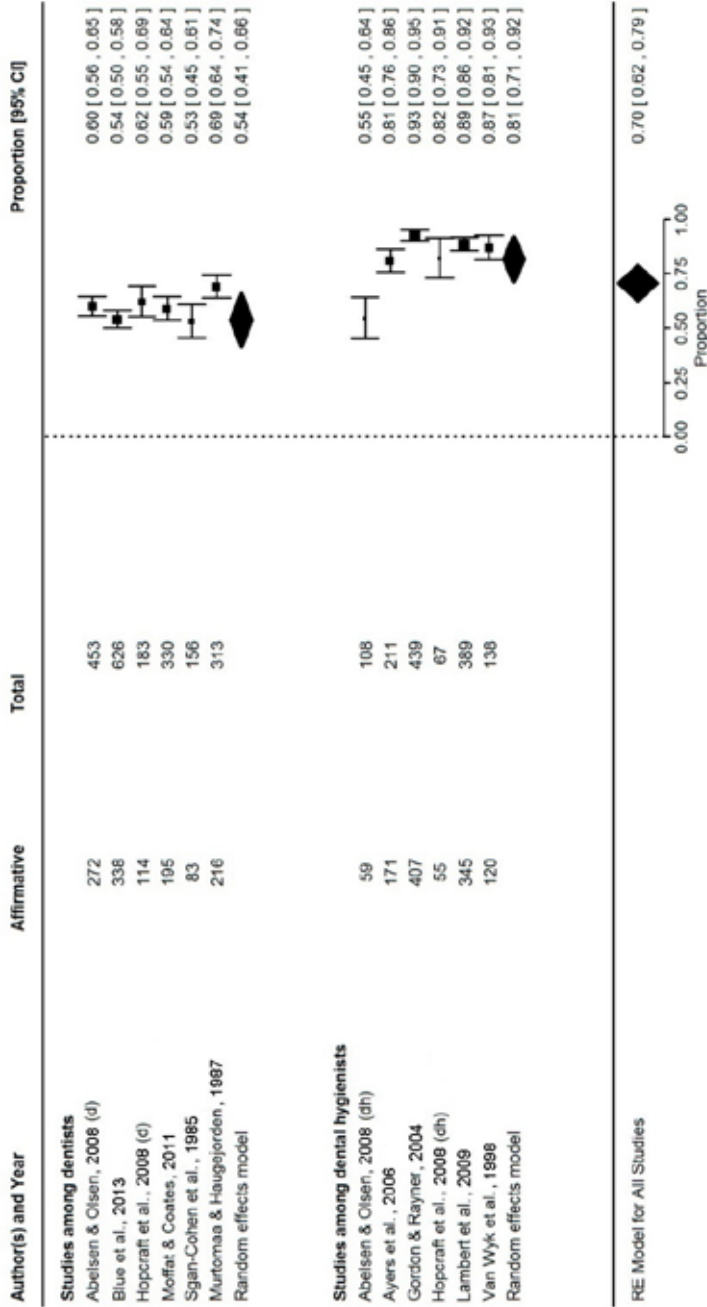
Quality assessment of included studies

Study	Selection bias	Study design	Data collection methods	Global rating
Abelsen & Olsen, 2008	moderate	strong	strong	strong
Adams, 2004b	moderate	strong	moderate	strong
Ayers et al., 2006	strong	strong	strong	strong
Benicewicz & Metzger, 1989	moderate	strong	moderate	strong
Blue et al., 2013	weak	weak	moderate	weak
Gordon & Rayner, 2004	moderate	moderate	moderate	strong
Hopcraft et al., 2008	moderate	strong	moderate	strong
Kaldenberg & Smith, 1990	moderate	strong	moderate	strong
Lambert et al., 2009	moderate	strong	strong	strong
Moffat & Coates, 2011	moderate	strong	moderate	strong
Murtomaa & Haugejorden, 1987	strong	strong	moderate	strong
Sgan-Cohen et al., 1985	weak	weak	weak	weak
Van Dam et al., 2009	weak	weak	weak	weak
Van Wyk et al., 1998	moderate	strong	strong	strong

### Outcomes of included studies

The Forest plot from the meta-analysis in Figure 2 gives, for each study, the number of respondents expressing a positive attitude towards extended scope of dental hygiene practice, the corresponding totals of dentists and dental hygienists, respectively, the proportion and corresponding 95% confidence intervals. It can be observed that all proportions among dental hygienists are larger compared to those from the dentists, with the Abelsen & Olsen (2008) study as the only exception. The meta proportion for the dentists is 0.54 (95% CI 0.41; 0.66) and for the dental hygienists is 0.81 (95% CI 0.71; 0.92). The Wald statistic (Knapp & Hartung, 2003) revealed no evidence for an effect of year of publication (estimate=-0.002, se=0.004,  $t=-0.494$ ,  $p=0.634$ ), and strong evidence (Sellke, Bayarri & Berger, 2001) for the difference in proportions of positive attitudes between the two professions towards extended scope of dental hygiene practice (estimate=-0.230, se=0.063,  $t=-3.631$ ,  $p=0.006$ ).

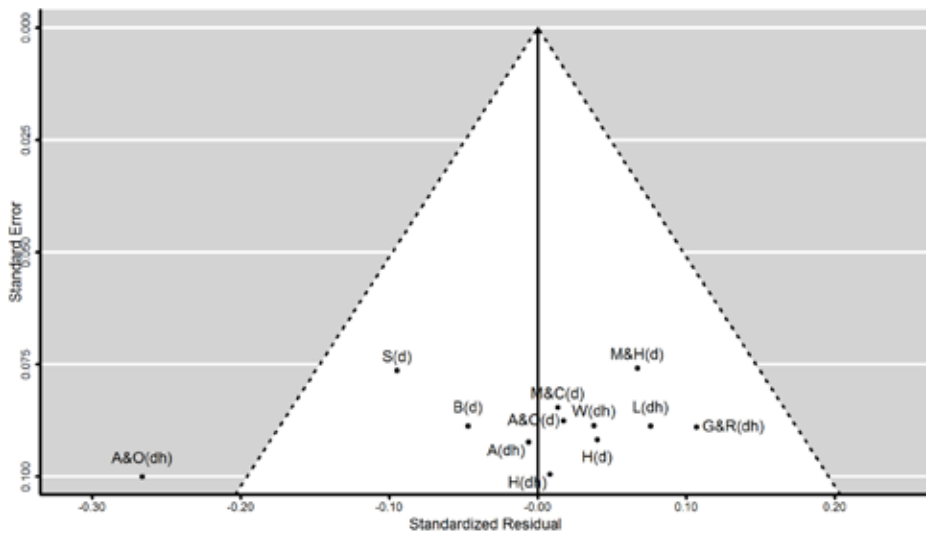
**Figure 2.** Forest plot from the meta-analysis with the number of respondents expressing a positive attitude towards extended scope of dental hygiene practice, the corresponding totals of dentists and dental hygienists, respectively, the proportion and corresponding 95% confidence intervals



The funnel plot in Figure 3, with the standardized residuals versus standard errors of the mixed model for meta-analysis, reveals the Abelsen & Olsen (2008) study among dental hygienists as outlying to the left. A further sensitivity analysis indicates this study to be influential according to a studentized residual of -4.381 and Cooks distance of 1.426. The funnelplot regression test indicates some degree of asymmetry ( $t = -2.612$ ,  $df = 8$ ,  $p = 0.031$ ) (Harbord et al., 2006). All but one studies are within the boundries indicating no publication bias.

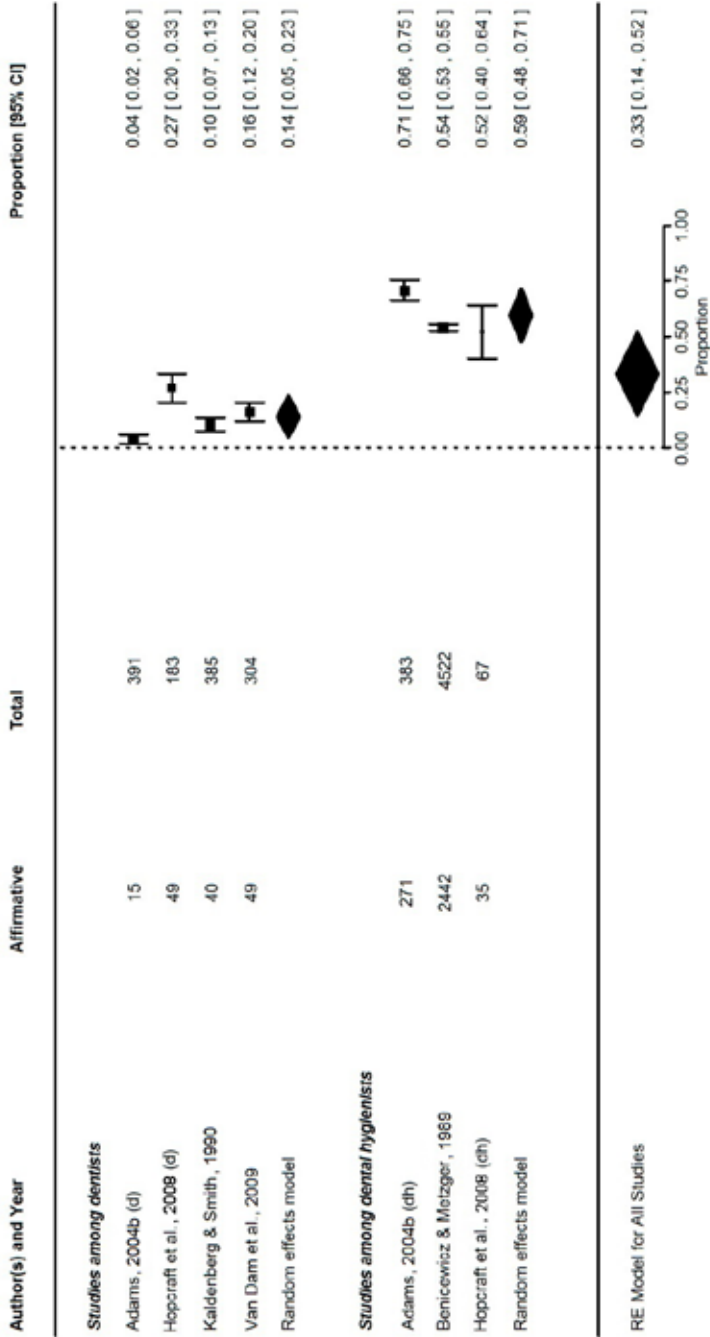
**Figure 3.**

Funnel plot with standardized residuals versus standard errors from meta-analysis of studies on proportions of positive attitude towards extended scope of dental hygiene practice among dentists and dental hygienists (A&O = an included study: Abelsen & Olsen, 2008 / (d) = dentists / (dh) = dental hygienists)



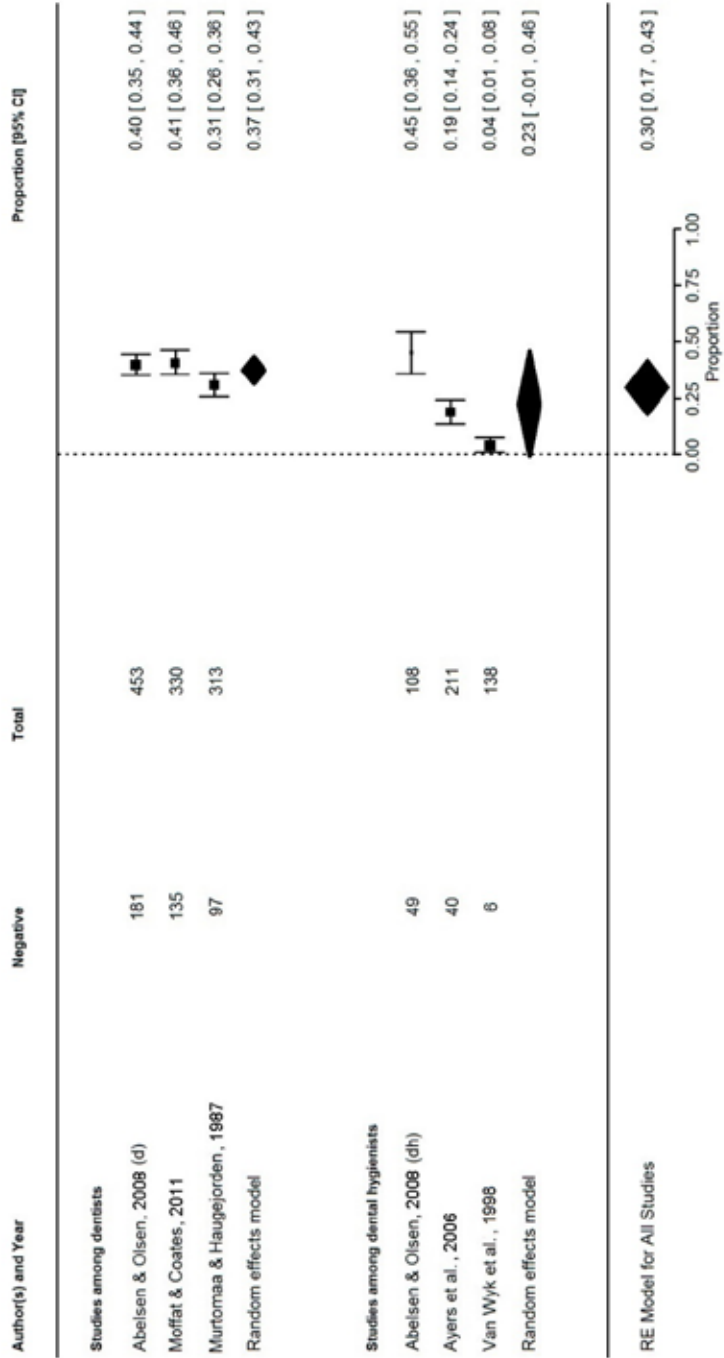
The Forest plot from the meta-analysis in Figure 4 gives, for each study, the number of respondents expressing a positive attitude towards independent dental hygiene practice, the corresponding totals of dentists and dental hygienists, respectively, the proportion and corresponding 95% confidence intervals. It can be observed that all proportions among dental hygienists are larger compared to those from the dentists. The estimated meta proportion for the dentists is 0.14 (95% CI 0.05; 0.23) and for the dental hygienists 0.59 (95% CI 0.48; 0.71). The Wald statistic (Knapp & Hartung, 2003) revealed no evidence for an effect of year of publication (estimate=0.005, se=0.006, z=0.882, p=0.428), and strong evidence (Sellke et al., 2001) for the difference in proportions of positive attitudes between the two professions towards extended scope of dental hygiene practice (estimate=-0.476, se=0.081, z=-5.860, p=0.004). A funnel plot could not be analyzed since less than ten studies were included<sup>78</sup>.

**Figure 4.** Forest plot from the meta-analysis with the number of respondents expressing a positive attitude towards independent dental hygiene practice, the corresponding totals of dentists and dental hygienists, respectively, the proportion and corresponding 95% confidence intervals



The Forest plot from the meta-analysis in Figure 5 gives, for each study, the number of respondents expressing a negative attitude towards extended scope of dental hygiene practice, the corresponding totals of dentists and dental hygienists, respectively, the proportion and corresponding 95% confidence intervals. It can be observed that proportions among dental hygienists are more heterogeneous compared to those from the dentists. The meta proportion for the dentists is 0.37 (95% CI 0.31; 0.43) and for the dental hygienists is 0.23 (95% CI -0.01; 0.46). The Wald statistic (Knapp & Hartung, 2003) revealed no evidence for an effect of year of publication (estimate= 0.008, se=0.007, t=1.161, p=0.330), and no evidence (Sellke et al., 2001) for the difference in proportions of negative attitudes between the two professions towards extended scope of dental hygiene practice (estimate=0.166, se= 0.118, t=1.407, p= 0.254). A funnel plot was not constructed made since less than ten studies were available (Sterne, Egger, & Moher, 2008).

**Figure 5.** Forest plot from the meta-analysis with the number of respondents expressing a negative attitude towards extended scope of dental hygiene practice, the corresponding totals of dentists and dental hygienists, respectively, the proportion and corresponding 95% confidence intervals





No forest plot and funnel plot were made for negative attitude towards independent dental hygiene practice since only three studies among dentists and a single study among dental hygienists were available (Table 3). The majority of dentists from two out of three studies held a negative attitude. The study that reported a minority of dentists with a negative attitude originated from The Netherlands. The only study concerning dental hygienists reported a minority of practitioners with a negative attitude.

## Discussion

We found that a majority of dentists have a positive attitude and a minority has a negative attitude towards extended scope of dental hygiene practice. A minority of dentists have a positive attitude towards independent dental hygiene practice. Analysis of included studies regarding a negative attitude of dentists towards independent dental hygiene practice is not conclusive. The different attitudes of dentists towards extended scope and independent dental hygiene practice can be explained by the following. High status occupations like dentists advance by delegating lower status skills and roles to subordinate groups like dental hygienists (Kronus, 1976; Larkin, 1983). This could explain why 54% of dentists have a positive attitude towards an extended scope of dental hygiene practice but only 14% of them have a positive attitude towards independent dental hygiene practice. When dental hygienists would become independent, they would no longer be subordinate and the dental profession would lose control over the provision treatment.

Our finding that a majority of dental hygienists have a positive attitude towards an extended scope of practice, can be explained by the following. The expanded function of the dental hygienist is considered necessary to provide the appropriate dental hygiene care (DeAngelis & Goral, 2000; Petrén et al., 2005), for example local anaesthesia (DeAngelis & Goral, 2000; Lobene, 1979; Sisty LePeau et al., 1992) and dental x-rays (Jansson, Lavstedt & Zimmerman, 2000; Laurell, Romao & Hugoson, 2003). Another explanation is the perceived need of dental hygienists for job enrichment. Extended scope of practice may contribute to more skill variety which increases job satisfaction (Hackman & Oldham, 1980). Finally, an extended scope of practice and independent practice can both contribute to higher professional status (Omark, 1978) and stronger professional identity (Tajfel & Turner, 1979).

Possible explanations for the difference between dentists and dental hygienists in attitude are a potential economic loss feared by dentists (Freidson, 1978) and perceived threat to quality of care by dentists (Ross, Ibbetson & Turner, 2007). Dentists want to maintain control over other oral health care occupations (Adams, 1999; Cotton, 1990). Independent dental hygiene practice may reduce this control. As a consequence, dentists may have less influence on billing and, for this reason, are less likely to be in favor of independent dental hygiene practice.

Furthermore, independent dental hygiene practice enables dental hygienists to practice without supervision requirements while some dentists have doubts about the competence of dental hygienists (Adams, 2004b) and some dental hygienists do not feel confident enough (Virtanen, Tseveenjav, Wang & Widström, 2011).

Eventhough this study has limitations, it also has some clear strengths. Attitude towards extended scope or independent practice did not depend on year of publication. In addition, the findings regard studies across varies countries When assessing the quality of the included studies, eleven out of fourteen studies have a strong quality. The outcomes of the three weak studies did not deviate from the other studies in the forest plots. Finally, with the Abelsen and Olsen study (2008) as the only exception, no publication bias was found with regard to studies concerning extended scope and independent practice. A weakness of this study is the relatively small number of studies found. A potential explanation for this is the heterogenous terminology in use for extended scope of practice, making identification of relevant studies more difficult. However, since the related articles search function was used, it is very likely that all relevant studies were detected. According to Chang et al. (2006) a related articles search yield considerable more publications compared with a Boolean search. Another weakness is that regression test for funnel plot asymmetry concerning independent practice could not be applied since there are only seven studies available. The same applies for studies reporting negative attitudes towards extended scope and independent practice. In these analyses only six and four studies were included, respectively. For conclusiveness it has been recommended not to use the funnel plot asymmetry test when fewer than ten studies are available (Sterne et al., 2008). However, this recommendation is not only based on the number of included studies but also on the heterogeneity in meta-analysis. The test performance for funnel-plot asymmetry is somewhat poor with a small number of studies and a large heterogeneity in meta-analysis (Ioannidis & Trikalinos, 2007).

Several factors could influence the attitudes of dentists and dental hygienists. Variations of legislation is one variable that might explain different attitudes. However, the study of Lambert (2009) was conducted in three different American states with varying supervision levels: direct supervision (dentist off-site), collaborative (dentist on-site and off-site), and independent. In this study no significant differences with regard to supervision level and attitude could be found. The authors explicitly mentioned that the general response rate of 29% as a possible explanation for not finding significant differences.

Legislation of some countries is multi-jurisdictional and has a regional basis like Australia, Canada, Switzerland and the US (Johnson, 2009). Of the included studies regarding independent dental hygiene practice, three studies reported data on a regional level: Australia (Victoria), Canada (Ontario), and USA (Oregon). Dental hygienists were not allowed to practice independently at the time of publication. However, dental hygienists were allowed

independent practice during the publication of a Dutch study. The Dutch study reported a much higher proportion of dentists with a positive attitude towards independent dental hygiene practice compared to the other studies. In addition, in the Canadian study, dentists who employed a dental hygienist held more positive attitudes towards independent dental hygiene practice compared to nonemployers. Dentists who oppose independent dental hygiene practice from the Victoria, Ontario, and Oregon studies argued dental hygienists lack training or knowledge to practice independently from the dentist. It seems that the experience of working with dental hygienists might explain these attitudinal differences. Unfortunately, the number of studies is too small to perform a separate meta-analysis.

More studies reported percentages of practitioners with positive attitudes related to two types of task shifting compared to negative attitudes. This could introduce a bias. Ten out of the fourteen included studies measured negative attitudes of which eight studies actually reported these attitudes. More specifically, with regard to extended scope of dental hygiene practice, three studies provided data on negative attitudes of dentists and three studies on negative attitudes of dental hygienists. Outcomes regarding negative attitudes of dental hygienists were rather heterogeneous, the outcomes regarding negative attitudes of dentists were homogeneous. The latter confirmed that the majority of dentists are not opposed to an extended scope of dental hygiene practice. However, not enough studies regarding negative attitudes towards independent practice were available for a thorough meta-analysis. The heterogeneity of study outcomes within the group of dental hygienists with regard to a negative attitude towards extended scope of practice, could be explained by a disunity of their profession. This emerging profession consists of different generations of dental hygienists with different qualifications and privileges due to changes in policy and regulations in a relatively short time (Johnson, 2009). Dentist is a much older occupation having a well-established professional status (Morison, Marley, Stevenson & Milner, 2008). The latter is reflected by a more homogenous outcomes of studies regarding attitudes of dentists towards task shifting.

Many variables could have influenced attitudes towards extended scope of practice and independent practice like different ratios of dentists and dental hygienists per country, attitude related to specific tasks, position and maturity of profession. With regard to the ratio of these two professions: in the United States the ratio is almost equal (Yamalík, Ensaldó-Carrasco, Cavalle & Kell, 2014), while dental hygienists in New Zealand are clearly a minority compared to the number of dentists (Dental Council New Zealand, 2015). However, the proportions of dentists with a positive attitude towards extended scope of dental hygiene practice hardly differ between these two countries (Blue et al., 2013; Moffat & Coates, 2011). If the same applies to the dental hygienists of these two countries is not known. With regard to the reasons related to specific tasks: some dental tasks are perceived by dental hygienists as important to their professional role (Petrén et al., 2005). Because of the limited information that is available about the attitude of practitioners with regard to specific tasks, more research

is needed in this matter. In addition, motives in favor and against task shifting should be identified. Social position might also influence attitudes. Some dentists still perceive dental hygienists as a dental auxiliary (Swanson Jaecks, 2009). However, not much is known about the social and psychological implications of task shifting and independent practice (McKeown, Sunell, Wickstrom, 2003; Gillis, 2000). Another factor that may influence attitudes in this study is maturity of the dental hygiene profession, as this is different between countries. More specifically, the first year of legislation of practice in the USA was 1917, in Canada 1952, in South Africa 1969, in Australia and Finland 1972, in The Netherlands 1974, in Israel 1978, in Norway 1979, and New Zealand 1988 (Coates, Kardos, Moffat & Kardos, 2009; Danner, 2002). However, there does not seem to be any relation between professional maturity and the proportion of practitioners with a positive attitude. For example, dentists in the USA and in Israel are similar with regard to a positive attitude towards extended scope of dental hygiene practice and to Australian and New Zealand dental hygienists with regard to independent dental hygiene practice.

### **Conclusion**

Dentists and dental hygienists differ in their attitude towards extended scope of dental hygiene practice but differ mostly with regard to independent dental hygiene practice. Positive attitudes are present in a majority of dentists as well as dental hygienists with regard to extended scope of dental hygiene practice, while for independent dental hygiene practice this holds for a minority of dentists and a majority of dental hygienists.

### **Acknowledgments**

In carrying out this study, the authors would like to thank Letty Hartman, Senior Librarian of the Hanzemediatheek from the Hanze University of Applied Sciences, for her expertise and support regarding the retrieval of literature for the meta-analyses. We also like to show our gratitude for the financial support provided by Hanze University of Applied Sciences PhD Fund, School of Dentistry (University of Groningen), and the Center for Dentistry and Oral Hygiene, University Medical Center Groningen.

### **Competing interests statement**

None declared.

## References

- Abelsen, B. & Olsen, J.A. (2008). Task division between dentists and dental hygienists in Norway. *Community Dentistry and Oral Epidemiology*, 36, 558-566.
- Adams, T. (1999). Dentistry and medical dominance. *Social Science & Medicine*, 48, 407-420.
- Adams, T.L. (2004a). Inter-professional conflict and professionalization: dentistry and dental hygiene in Ontario. *Social Science & Medicine*, 58, 2243-2252.
- Adams, T.L. (2004b). Attitudes to independent dental hygiene practice: dentists and dental hygienists in Ontario. *Journal Canadian Dental Association*, 70(8), 535-538.
- ADHA (2016). The Benefits of Dental Hygiene-Based Oral Health Provider Models. <https://www.adha.org>. Retrieved: September 23, 2017.
- Ayers, K., Meldrum, A.M., Thomson, W.M., & Newton, J.T. (2006). The working practices and job satisfaction of dental dygienists in New Zealand. *Journal of Public Health Dentistry*, 66(3), 186-191.
- Ayers, K.M.S., Thomson, W.M., Rich, A.M. & Newton, J.T. (2008). Gender differences in dentists' working practices and job satisfaction. *Journal of Dentistry*, 36, 343-350.
- Benicewicz, D. & Metzger, C. (1989). Supervision and practice of dental hygienists: report of ADHA survey. *Journal of Dental Hygiene*, 63(4), 173-180.
- Bernie, K.M. (2001). Advantages of expanding the role of the registered dental hygienist in tooth whitening. *Dentistry Today*, 20(7), 56-61.
- Blue, C.M, Funkhouser, D.E., Riggs, S., Rindal, D.B., Worley, D., Pihlstrom, D.J., Benjamin, P., & Gilbert, G.H. (2013). Utilization of nondentist providers and attitudes toward new provider models: findings from the National Dental Practice-Based Research Network. *Journal of Public Health Dentistry*, 73, 237-244.
- Brewer, M.B. (2003). Optimal distinctiveness, social Identity, and the self. In M.R.Leary & J.P.Tangney (Eds), *Handbook of self and identity* (pp. 480-491). New York, NY: Guilford Press.
- Brian, J. & Cooper, M.D. (1997). Utilization of advanced hygienist skills in the private practice. *Journal of the Indiana Dental Association*, 76(3),13-16.
- Bruers, J. J., Van Rossum, G.M., Felling, A.J., Truin, G.J., Van 't Hof, M.A. (2003). Business orientation and willingness to distribute dental tasks of Dutch dentists. *International Dental Journal*, 53(4), 255-263.
- Buchan, J., Ball, J., & O'May, F. (2001). If changing skill mix is the answer, what is the question? *Journal of Health Services Research & Policy*, 6(4), 235-236.
- CED (2014). Council of European Dentists (CED) and the Association of Dental Education in Europe (ADEE): Competences of Dental Practitioners, CED-DOC-2013-030-E (effective from 6 June 2014). [www.cedentists.eu](http://www.cedentists.eu). Retrieved: September 23, 2017.

- Chang, A.A., Heskett, K.M., & Davidson, T.M. (2006). Searching the literature using medical subject headings versus text word with PubMed. *Laryngoscope*, 116(2), 366-340.
- Christensen, G. J. (1995). Increasing patient service by effective use of dental hygienists. *Journal of the American Dental Association*, 126,1291-1294.
- Coates, D.E., Kardos, T.B., Moffat, S.M., & Kardos, R.L. (2009). Dental therapists and dental hygienists educated for the New Zealand environment. *Journal of Dental Education*, 73(8), 1001-1008.
- Cohen, J. (1960). A coefficient of agreement for nominal scales. *Educational and Psychological Measurement*, 20, 37-46.
- Corbey-Verheggen, M.J. (2001). Oral hygienist with extended competencies. *Nederlands Tijdschrift voor Tandheelkunde*, 108(8), 323-325.
- Cotton, F. (1990). Quality control, or just control? *Journal of Dental Hygiene*, 64(7), 320-322.
- Danner, V. (2002). Looking back at 75 years of the journal: Former editors reflect on their time with the journal. *Journal of Dental Hygiene*, 76(1), 10-13.
- DeAngelis, S. & Goral, V. (2000). Utilization of local anesthesia by Arkansas dental hygienists, and dentists' delegation/satisfaction relative to this function. *International Journal of Dental Hygiene*, 74(3),196-204.
- Dental Council New Zealand (2015). [www.dcnz.org.nz](http://www.dcnz.org.nz). Retrieved: 13th of October 2015.
- Eagly, A.H. & Chaiken, S. (1999). *The psychology of attitudes*. Fort Worth, TX: Harcourt Brace Jovanovich.
- EDHF (2015). Professional Profile and Competences of Dental Hygienists in Europe, EDHF resolution, adopted by the EDHF General Assembly on 12 September 2015. [www.edhf.eu](http://www.edhf.eu). Retrieved: September 23, 2017.
- Edgington, E. & Pimlott, J. (2000). Public attitudes of independent dental hygiene practice. *Journal of Dental Hygiene*, 2000 74(4), 261-270.
- Falcon, H. (2010). Summary of: Modelling workforce skill-mix: how can dental professionals meet the needs and demands of older people in England? *British Dental Journal*, 208(3),116-117.
- Fleiss, J.L. (1981). *Statistical methods for rates and proportions*. (2nd Ed., pp. 38-46). New York: John Wiley & Sons.
- Fones, A. C. (1934). *Mouth hygiene*. (4th Ed., pp. 248). Philadelphia (PA): Leas & Febiger.
- Fortner, H.S. (2008). A CDT code for hygienists. *Registered Dental Hygienist*, 28-33.
- Freidson, E. (1978). *The official construction of occupations: an essay on the practical epistemology of work*. Uppsala, Sweden: 9th World Congress of Sociology.
- GDC (2013). General Dental Council of the United Kingdom: Scope of Practice for Dentists, Clinical dental technicians, Dental therapists, Dental hygienists, Orthodontic therapists, Dental nurses (effective from 30 September 2013). <https://www.gdc-uk.org>. Retrieved: September 23, 2017.

- Gillis, M.V. (2000). Local Anesthesia Delivery by Dental Hygienists: An Essential Component of Contemporary Practice. *Journal of Practical Hygiene*, 9(6), 19-22.
- Gordon, N.A. & Rayner, C.A. (2004). A national survey of oral hygienists in South Africa. *Journal of the South African Dental Association*, 59(5), 184, 186-188.
- Hackman, J.R. & Oldham, G.R. (1980). *Work Redesign*. Reading, MA: Addison-Wesley.
- Harbord, R.M., Egger, M., & Sterne, J.A.C. (2006). A modified test for small-study effects in meta-analyses of controlled trials with binary endpoints. *Statistics in Medicine*, 25(20), 3443-3457.
- Harris, R.V. & Sun N. (2012). Dental practitioner concepts of efficiency related to the use of dental therapists. *Community Dentistry and Oral Epidemiology*, 40, 247-256.
- Heuvel van der, J., Jongbloed-Zoet, C., & Eaton, K. (2006). The new style dental hygienist – changing oral health care professions in the Netherlands. *Dental Health*, 44, 3-10.
- Hopcraft, M., McNally, C., Ng, C., Pek, L., Pham, T.A., Phoon, W.L., Poursoltan, P., & Yu, W. (2008). Attitudes of the Victorian oral health workforce to the employment and scope of practice of dental hygienists. *Australian Dental Journal*, 53(1), 67-73.
- Ioannidis, J.P.A. & Trikalinos, T.A. (2007). The appropriateness of asymmetry tests for publication bias in meta-analyses: a large survey. *Canadian Medical Association Journal*, 176(8), 1091-1096.
- Jansson, L., Lavstedt, S., & Zimmerman, M. (2000). Prediction of marginal bone loss and tooth loss—a prospective study over 20 years. *Journal of Clinical Periodontology*, 29, 672-678.
- Jerković-Ćosić, K., Van Offenbeek, M.A. & Van der Schans, C.P. (2012). Job satisfaction and job content in Dutch dental hygienists. *International Journal of Dental Hygiene*, 10(3), 155-162.
- Johnson, P.M. (2009). International profiles of dental hygiene 1987 to 2006: a 21-nation comparative study. *International Dental Journal*, 59, 63-77.
- Jongbloed-Zoet, C., Bol-van den Hil, E.M., La Rivière-Ilsen, J., van der Sanden-Stoelinga, M.S. (2012). Dental hygienists in The Netherlands: the past, present and future. *International Journal of Dental Hygiene*, 10(3), 148-154.
- Kaldenberg, D.O. & Smith, J.C. (1990). The independent practice of dental hygiene: a study of dentists' attitudes. *General Dentistry*, 38(4), 268-271.
- Kidd, M.R., Watts, I.T., Mitchell, C.D., Hudson, L.G., Wenck, B.C., Cole, N.J. (2006). Principles for supporting task substitution in Australian general practice. *Medical Journal of Australia*, 185, 20-22.
- Knapp, G. & Hartung, J. (2003). Improved tests for a random effects meta-regression with a single covariate. *Statistics in Medicine*, 22, 2693-2710.
- Kronus, C.L. (1976). The evolution of occupational power. *Sociology of Work and Occupations*, 3(1), 3-37.
- Lambert, D., George, M., Curran, A., Lee, J. & Shugars, D. (2009). Practicing Dental Hygienists' Attitudes toward the

- Proposed Advanced Dental Hygiene Practitioner: A Pilot Study. *Journal of Dental Hygiene* 83(3), 117-125. Larkin, G.V. (1983). *Occupational Monopoly and Modern Medicine*. London: Tavistock.
- Laurell, L., Romao, C., & Hugoson A. (2003). Longitudinal study on the distribution of proximal sites showing significant bone loss. *Journal of Clinical Periodontology*, 30, 346-352.
- Lecca, P.J., Valentine, P., & Lyons, K.J. (2003). *Allied health: practice issues and trends in the new millennium*. New York: The Haworth Press.
- Lin, J. & Wilbur, W.J. (2007). PubMed related articles: a probabilistic topic-based model for content similarity. *BMC Bioinformatics*, 8, 423.
- Lobene, R. (1979). *The Forsyth Experiment*. Massachusetts: Harvard University Press.
- Macdonald, K.M. (1999). *The sociology of the professions*. London: Sage.
- McKeown, L., Sunell, S., Wickstrom, P. (2003). The discourse of dental hygiene practice in Canada. *International Journal of Dental Hygiene*, 1(1), 43-48.
- MHWS (2006). Ministry of Health, Welfare and Sports of The Netherlands: Bulletin of Acts, Orders and Decrees of the Kingdom of the Netherlands, Volume 2006 nr. 147 (effective from 21 February 2006). <https://www.government.nl/ministries/ministry-of-health-welfare-and-sport>. Retrieved: September 23, 2017.
- Moffat, S. & Coates, D. (2011). Attitudes of New Zealand dentists, dental specialists and dental students towards employing dual-trained Oral Health graduates. *British Dental Journal*, 211:E16.
- Moher, D., Liberati, A., Tetzlaff, J., Altman, D.G., The PRISMA Group. (2009). Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *Journal of Clinical Epidemiology*, 62:1006–1012.
- Morison, S., Marley, J., Stevenson, M., & Milner, S. (2008). Preparing for the dental team: investigating the views of dental and dental care professional students. *European Journal Dental Education*, 12, 23-28.
- Murtomaa, H. & Haugejorden, O. (1987). Finnish dentists' attitudes towards, and experience of, expanded-duty dental hygienists. *Community Dental Health*, 4(2), 143-150.
- Nash, D.A. (2009). Expanding dental hygiene to include dental therapy: improving access to care for children. *Journal of Dental Hygiene*, 83(1), 36-44.
- Nash, D.A., Friedman, J.W., Kavita, R. & Mathu-Muju, K.R. (2012). *A Review of the Global Literature on Dental Therapists. In the Context of the Movement to Add Dental Therapists to the Oral Health Workforce in the United States*. Michigan: W.K. Kellogg Foundation.
- NBHW (2005). National Board of Health and Welfare, Sweden: Competence Description for Registered Dental Hygienist, Article No. 2005-105-1 (effective from 2 October 2005). [www.en.tandhygienistforening.se](http://www.en.tandhygienistforening.se). Retrieved: September 23, 2017.
- Omark, R.C. (1978). Training therapy of psychotherapists: professional socialization as interprofessional relations. *Psychological Reports*, 42, 1307-1310.



- Oxford Dictionaries (2015). Oxford Dictionaries Online. Oxford University Press. Retrieved: 2th of April 2015.
- Petrén, V., Levin, G., Chohan, T., Preber, H., Candell, A., & Bergström, J. (2005). Swedish dental hygienists' preferences for workplace improvement and continuing professional development. *International Journal of Dental Hygiene*, 3(3),117-125.
- Plager K. & Conger M. (2006). Advanced Practice Nursing: Constraints to Role Fulfillment. *The Internet Journal of Advanced Nursing Practice*, 9(1).
- Ross, M.K, Ibbetson, R.J, & Turner, S. (2007). The acceptability of dually-qualified dental hygienist-therapists to general dental practitioners in South-East Scotland. *British Dental Journal*, 202, E8.
- Sellke, T., Bayarri, M.J. & Berger, J.O. (2001). Calibration of p Values for Testing Precise Null Hypotheses. *American Statistical Association*, 55(1), 62-71.
- Sgan-Cohen, H., Mann, J. & Greene, J.J. (1985). Expected functions of dental hygienists in Jerusalem. Perceptions of dentists and dental hygiene students. *Dental hygiene (Chic)*, 59(12), 558-562.
- Sisty LePeau, N., Nielson Thompson, N. & Lutjen D. (1992). Use, need and desire for pain control procedures by Iowa hygienists. *Journal of Dental Hygiene*, 66(3),137-146.
- Sterne, J., Egger, M. & Moher, D. (2008). Addressing reporting biases. In J.Higgins & S.Green (Eds.), *Cochrane Handbook for Systematic Reviews of Interventions. Version 5.0.0.* (pp. 297–333). Chichester: John Wiley & Sons Ltd.
- Swanson Jaecks, K.M. (2009). Current perceptions of the role of dental hygienists in interdisciplinary collaboration. *Journal of Dental Hygiene*, 83(2), 84-91.
- Tajfel, H., & Turner, J.C. (1979). An integrative theory of intergroup conflict. In W.G.Austin, S.Worchel (Eds), *The Social Psychology of Intergroup Relations* (pp.33-47). Monterey, CA: Brooks-Cole.
- Thomas, B.H., Ciliska, D., Dobbins, M., & Micucci, S. (2004). A process for systematically reviewing the literature: Providing the research evidence for public health nursing interventions. *Worldviews on Evidence-Based Nursing*, 1(3), 176-184.
- Van Dam, B.A., Den Boer, J.C. & Bruers, J.J. (2009). Recently graduated dentists: working situation and future plans. *Nederlands Tijdschrift Tandheelkunde*, 116(9), 499-506.
- Van Wyk, C.W., Toogood, S., Scholtz, L., & Stander, I. (1998). South African oral hygienists: their profile and perception of their profession and career. *South African Dental Journal*, 53(12), 537-546.
- Viechtbauer, W. (2010). Conducting meta-analyses in R with the metafor package. *Journal of Statistical Software*, 36(3),1-48.
- Virtanen, J.I., Tseveenjav, B., Wang, N.J., & Widström, E. (2011). Nordic dental hygienists' willingness to perform new treatment measures: barriers and facilitators they encounter. *Scandinavian Journal of Caring Sciences*, 25(2), 311-316.
- Wang, Q. (2000). Working conflicts of nurses in hospital. *China Journal Net*, 35, 732–734.
- WHO (2006). The world health report 2006 - Working together for health. Geneva: World Health Organization. www.who.int. Retrieved: September 24, 2017.

Widström, E., Eaton, K.A., & Luciak-Donsberger, C. (2010). Changes in dentist and dental hygienist numbers in the European Union and Economic Area. *International Dental Journal*, 60, 311-316.

Yamalik, N., Ensaldó-Carrasco, E., Cavalle, E., & Kell, K. (2014). Oral health workforce planning part 2: figures, determinants and trends in a sample of World Dental Federation member countries. *International Dental Journal*, 64(3), 117-126.





# CHAPTER 3

---

## Reasons that Dutch dentists and dental hygienists oppose or support an extended scope of practice for dental hygienists

Jan Jaap Reinders

Wim P. Krijnen

Katarina Jerković-Ćosić

Merlijn Lycklama à Nijeholt

Marjolein A.G. van Offenbeek

Boudewijn Stegenga

Cees P. van der Schans

*Accepted by the Journal of Allied Health*

**Abstract**

**Introduction** – In the Netherlands, the scope of dental hygiene practice was expanded beginning in 2006. The objective of this study was to explore reasons for supporting or opposing an extended scope of practice and to find explanatory factors.

**Materials and methods** - A questionnaire containing pre-defined reasons and an open-ended question was distributed among 1674 randomly selected members of two Dutch professional associations (874 dentists; 800 dental hygienists). Data were analyzed with binary logistic regression with BIC model selection.

**Results** - Response concerned 541 practitioners (32.3%), i.e., 233 dentists (43.1%) and 308 dental hygienists (56.9%). Non-response analysis revealed no differences and representativeness analysis showed similarities between samples and target populations. Most often, dentists reported flexible collaboration (50.2%) and dental hygienists indicated task variation (71.1%) as supportive reasons. Also, dentists generally reported quality of care (41.2%) and dental hygienists self-competence (22.7%) as opposing reasons. Reasons were explained by profession, gender, and new style practitioners. **Discussion** – Dentists and dental hygienists conveyed different reasons for supporting or opposing an extended scope of dental hygiene practice.

**Conclusion** - Outcomes can be categorized as reasons related to economic, professional status, quality, job satisfaction, and flexible collaboration and are not only explained by profession.

**Key words:** Policy, Extended scope of practice, Dental Hygienists, Dentists, Perceptions, Dental care, Allied health care

**Introduction**

The scope of dental hygiene practice continues to develop due to changing legislation and policies in many countries (Battrell, 2012; Gibson-Howell Hicks, 2010). Nevertheless, the implementation of this extended scope policy is limited as well as the understanding of why an extended scope of dental hygiene practice is supported or opposed (Abelsen & Olsen, 2008; Adams, 1999; Capaciteitsorgaan, 2013). Profession related factors have been identified as influential barriers to extending this scope (Reinders, Krijnen, Onclin, Van der Schans & Stegenga, 2017a; Reinders, Krijnen, Stegenga & Van der Schans, 2017b; Northcott et al., 2013; Kravitz & Treasure, 2007). Thus far, it is not clear what reasons are considered as most relevant to support or oppose it.

An extended scope of dental hygiene practice concerns the rational redistribution of tasks between dentists and dental hygienists (Sibbald, Laurant & Scott, 2006). The recognized profession of Dutch dental hygienists was extended beginning in 2006 with certain dental tasks such as dental check-ups, administration of local anesthesia, diagnosis and treatment of initial caries, and taking dental radiographs (Jerkovic, Van Offenbeek, Slot & Van Der Schans, 2010). An extended scope can enhance efficiency (DeAngelis & Goral, 2000), increase patient comfort (DeAngelis & Goral, 2000), make oral health care more accessible (Edgington & Pimlott, 2000), and reduce costs (Fortner, 2008). Nevertheless, this policy is stagnating in the Netherlands (Capaciteitsorgaan, 2013). It is likely that the reasons to support or oppose an extended scope of dental hygiene practice will differ depending on the professional position, and these reasons may provide explanations as to why this stagnation occurs and what factors might obstruct or enhance this extended scope of practice.

Factors including the type of profession (Abelsen & Olsen, 2008), gender (Adams, 2004), age (Virtanen, Pellikka, Singh & Widström, 2015), old or new style (practitioners trained before or after the introduction of an extended scope of dental hygiene practice; Jerković-Ćosić, Van Offenbeek & Van der Schans, 2012), work experience (Isman & Farrell, 2014), and working hours (Vick, 2015) may influence the considerations to support or oppose an extended scope of dental hygiene practice. Dental hygienists could aspire to obtain a professional status and extending their scope of practice with certain dental tasks might enhance this (Gillis, & Praker, 1996). Dentists who would like to expand their practice might have more business related motives for supporting an extended scope of dental hygiene practice (Kempster, Luzzi & Roberts-Thomson, 2015). Business revenues could be increased because of lower wages of dental hygienists. Wanting to expand a business is more likely among male dentists since they are more often practice owner than female dentists (McKay et al., 2016). Age might also explain reasons to support or oppose this policy. Dentists older than 60 years are less likely to be practice owners than younger dentists. In the Netherlands, a distinction can be made between old and new style dental hygienists (Jerkovic et al., 2010; Jongbloed-Zoet, Bol-van den Hil, La Rivière-Ilsen & Van der Sanden-Stoeling, 2012). Many of the first new style dental hygienists, those with an extended scope of practice, graduated in 2006 and were trained together with dental students. Work experience and work hours related to an extended scope are also likely to explain the reasons of dental hygienists for influencing perceptions regarding this policy (Jerkovic et al., 2010). So far, it is uncertain to what degree these profession related factors can explain why practitioners consider supporting or opposing an extended scope of dental hygiene practice.

The objective of this study was to explore the reasons of dentists and dental hygienists regarding an extended scope of dental hygiene practice and, in addition, to explore profession related explanatory factors.

## Materials and methods

### *Survey construction*

A hard-copy questionnaire and a cover letter (including a link to an online version of the questionnaire) were sent by mail on 27 March 2012. This questionnaire was distributed among Dutch dentists (n=874) and dental hygienists (n=800) who were randomly selected members of two Dutch professional associations using the random sampling function of SPSS. To maximize the response, each of the 1674 practitioners was offered the choice to complete a hard copy or a digital version of the questionnaire. A reminder was sent on 20 April 2012 after no completed surveys were received by the authors for a period of two weeks. The final data entry took place in March 2013.

Two methods were combined in sequential order to collect reasons that were considered salient to the support or opposition of extending the scope of dental hygiene practice. First, a literature search was conducted using the 'related articles' function in PubMed (Chang, Heskett & Davidson, 2006). The first article (Abelsen & Olsen, 2008) related to an extended scope of dental hygiene practice, dentists, and dental hygienists was identified with a regular Boolean search in PubMed. The 'related articles' of this publication were traced and screened to identify topics on the appreciation of an extended scope of practice. Second, individual open-ended interviews with field coding were conducted with two dentists and two dental hygienists to verify the already identified topics and to identify additional topics. The following topics were identified: income (Fortner, 2008), costs (Ross, Ibbetson & Turner, 2007), social status (Swanson Jaecks, 2009), professional identity (Gorter & Freeman, 2005), quality of care (DeAngelis & Goral, 2000; Swanson Jaecks, 2009), self-competence (perceived ability) (DeAngelis & Goral, 2000), work barriers<sup>2,4</sup>, task variation (Jerković-Ćosić et al., 2012), job enrichment (Jerković-Ćosić et al., 2012), and flexible collaboration (Rashid, Manoharan, Abufanas & Gallagher, 2013). Old or new style, practitioners that graduated before 2006 and those who graduated in or after 2006, respectively, were also included since the first Dutch dental hygienists with an extended scope of practice graduated in 2006. All of the identified topics were included in the final version of the survey. The entire set of survey items was introduced by 'When the dental hygienist performs these new tasks, this will impact...' followed by, for example, an item such as 'my income, this is why I would / would not\* let them perform these new tasks.' Respondents were requested to mark through what was not applicable. In addition, open-ended questions were added. Finally, two dentists and two dental hygienists were asked to pre-test the survey's comprehensibility. All survey items are shown in Figure 1.



**Figure 1.**

Questionnaire: reasons to support or oppose an extended scope of dental hygiene practice

This question concerns task shifting towards the dental hygienist ‘new style’. When the dental hygienist performs these new tasks, this will impact...

*More alternatives are possible*  
 \*Cross-out what is not applicable

- my income, this is why I would / would not\* let them perform these new tasks.
- the status of my profession, this is why I would / would not\* let them perform these new tasks.
- the quality of oral health care, this is why I would / would not\* let them perform these new tasks.
- the identity of my profession, this is why I would / would not\* let them perform these new tasks.
- the flexibility of collaboration, this is why I would / would not\* let them perform these new tasks.
- the costs, this is why I would / would not\* let them perform these new tasks.
- the freedom to perform more complex tasks, this is why I would / would not\* let them perform these new tasks.
- as an obstruction of my work, this is why I would / would not\* let them perform these new tasks.
- the enrichment of my work, this is why I would / would not\* let them perform these new tasks.
- my competence, this is why I would / would not\* let them perform these new tasks.
- other, namely..... this is why I would / would not\* let them perform these new tasks.

NOTE: The dental hygienist questionnaire omitted the phrase ‘let them’.

*Non-response analyses*

To determine potential non-response bias, differences between responders and potential non-responders were compared using Chi-square tests and an independent t-test. Initial respondents were compared with potential non-respondents (Gorter & Freeman, 2005). Potential non-respondents were approached with a reminder after no completed surveys were returned after a continuous period of two weeks.

*Representativeness analyses*

To determine potential selection bias, the representativeness of the samples was analyzed by comparing their characteristics with the target populations (populations of interest: all dentists and dental hygienists in the Netherlands). This was analyzed with a one-sample t-test.

*Statistical analyses*

The reasons for dentists and dental hygienists to support or oppose an extended scope of dental hygiene practice were compared using a Chi-square test. A binary logistic regression with minimum Bayesian Information Criterion (BIC) model selection was used. Explanatory factors of reasons to support or oppose an extended scope of dental hygiene practice were determined with this analysis. To explore differences between old and new style dentists and dental hygienists and differences between age categories per profession, a Chi-square test and a Mann-Whitney test were performed, respectively.

*Ethical approval*

The Institutional Review Board of the Hanze University of Applied Sciences approved the study. The study fulfills all of the requirements for respondent anonymity and is in agreement with regulations for publication of patient and respondent data.

**Results***Non-response analysis*

The total response concerned 541 practitioners (32.3%); 233 dentists (43.1%); and 308 dental hygienists (56.9%). In Table 1, it can be observed that characteristics of the potential non-response group (II) are similar to the initial response group (I). When comparing age distribution, gender distribution, type of employment, and working hours, no statistical differences were determined.

**Table 1.**

Non-response analysis

Characteristics	Non-response analysis							
	Response group (all respondents)		Statistical comparison of response groups					
	I	II						
<b>Age distribution</b>	(n=460)	(n=81)	$\chi^2$	df	p			
≤ 29	12.8%	4.9%	7.718	4	.102			
30-39	27.8%	27.2%						
40-49	26.5%	23.5%						
50-59	26.1%	32.1%						
≥60	6.7%	12.3%						
<b>Gender distribution</b>								
male	71.7%	65.4%	1.325	1	.250			
female	28.3%	24.0%						
			t	df	p			
<b>Working hours*</b>	0.73 fte	0.74 fte	-.335	535	.738			
			Comparison response groups per profession					
			Dentists		Dental hygienists			
<b>Type of employment</b>	Dentists / Dental hygienists	Dentists / Dental hygienists	$\chi^2$	df	p	$\chi^2$	df	p
Practice owner	54.4% / 36.2%	60.5% / 44.2%	4.856	5	.434	1.197	3	.754
Production-based employment (or payroll employed by a dental practice)	19.0% / 47.9%	15.8% / 44.2%						
Production-based employment or payroll employed by a dental hygiene practice	n.a. / 3.8%	n.a. / 2.3%						
Working in a dental center	19.0% / n.a.	21.1% / n.a.						
Pay roll employment	4.1% / n.a.	0.0% / n.a.						
Freelance/ substitute	3.1% / n.a.	0.0% / n.a.						
Other	0.5% / 12.1%	2.6% / 9.3%						

\*fte=full time equivalent based on a work week of 40 hours / I= initial response / II= response after reminder / n.a. = not applicable (not measured according to the classification of Capaciteitsorgaan, 2013)

*Representativeness analysis*

In Table 2, the results of the representativeness analysis are described. No significant differences were ascertained regarding gender distribution between the samples of dentists and dental hygienists compared to values of their target populations. Within the sample of dentists, a majority of respondents (152 (65.2%)) were male and, within the sample of dental hygienists, six were male (1.9%). In addition, the types of employment of dental hygienists did not differ between the sample and target populations. The majority of dental hygienists (146 (47.4%)) was production-based employed or payroll employed by a dental practice. More than one-third (115 (37.3%)) of the dental hygienists owned their own practice. Differences between the sample and target populations were found with regard to the type of employment among dentists ( $\chi^2=69.298$ ,  $df=5$ ,  $p=.001$ ). Relatively more dentists (45 (19.3%)) working in a dental center were part of the sample compared with the target populations (531 (6%)). Age distributions differed between sample and target population values among dentists ( $\chi^2=18.276$ ,  $df=4$ ,  $p=.001$ ) and dental hygienists ( $\chi^2=26.753$ ,  $df=4$ ,  $p<.001$ ). The age category of dentists between 55 and 59 years old was larger in the sample (97 (41.6%)) compared to the value of the target population (2568 (29%)). The age category of dental hygienists younger than 29 years old was smaller in the sample (43 (14.0%)) compared to the value of the target populations (836 (26%)).

**Table 2**

Representativeness analysis

	Sample dentists* (n=233)	Population dentists** (n=8.854)	Statistical analysis of representativeness			Sample dental hygienists* (n=308)	Population dental hygienists** (n=3.216)	Statistical analysis of representativeness		
			Chi2	df	p			Chi2	df	p
<b>Age distribution</b>										
≤ 29	8.6%	11%	18.276	4	.001	14.0%	26%	26.753	4	.000
30-39	16.7%	21%				36.0%	34%			
40-49	19.7%	24%				30.8%	24%			
50-59	41.6%	29%				15.9%	14%			
≥60	13.3%	15%				3.2%	2%			
<b>Gender distribution</b>										
female	34.8%	34%	0.061	1	.806	98.1%	97%	1.171	1	.279
male	65.2%	66%				1.9%	3%			
<b>Type of employment</b>										
Practice owner	55.4%	62%	69.298	5	.001	37.3%	36%	4.455	3	.216
Production-based employment (or payroll employed by a dental practice)	18.5% (3.4%)	18% (5%)				47.4%	46%			
Production-based or payroll employed by a dental hygiene practice						3.6%	6%			
Working in a dental center	19.3%	6%				-	-			
Freelance/substitute	2.6%	2%				-	-			
Other	0.9%	2%				11.7%	14%			

\*Practitioners in the sample of this study / \*\*Dutch populations of dentists and of dental hygienists, source: Capaciteitsorgaan. Capaciteitsplan 2013. Voor de medische, tandheelkundige, klinisch technologische en aanverwante (vervolg)opleidingen. Utrecht: Stichting Capaciteitsorgaan voor Medische en Tandheelkundige Vervolgopleidingen. 2013 *Dutch*

*Comparison of professions and considerations on extended scope of dental hygiene practice*

Reasons to support or oppose an extended scope of dental hygiene practice vary per profession (Table 3). Dentists considered flexible collaboration (117 (50.2%)), job enrichment (81 (34.8%)), quality of care (70 (30.0%)), and task variation (65 (27.9%)) as the four most important topics when supporting an extended scope of dental hygiene practice. Quality of care (96 (41.2%)) was one reason dentists opposed it.

The five considerations for an extended scope of dental hygiene practice most often reported by dental hygienists were task variation (219 (71.1%)), quality of care (152 (49.4%)), flexible collaboration (144 (46.8%)), job enrichment (142 (46.4%)), and professional identity (126 (40.9%)). In all of the cases, these topics were considered as being supportive for extending it.

Dental hygienists reported more topics in consideration of supporting an extended scope of dental hygiene practice compared to the dentists. The five most significant differences between dentists and dental hygienists concerned task variation, self-competence, quality of care, professional identity, and social status (Table 3). The odds ratios in Table 3 show differences in consideration between dentists and dental hygienists, e.g., it is approximately six times more likely that task variation will be considered as a reason to support an extended scope of dental hygiene practice by a dental hygienist compared to a dentist.

**Table 3**  
Comparison of reasons of dentists (n=233) and dental hygienists (n=308) to support or oppose on an extended scope of dental hygiene practice.

Reason	In favor of an extended scope of dental hygiene practice				Against an extended scope of dental hygiene practice					
	% Dentists	% Dental hygienists	$\chi^2$	p	Odds ratio*	% Dentists	% Dental hygienists	$\chi^2$	p	Odds ratio*
Income	15.9	23.4	4.634	.031	1.587	8.6	10.1	0.341	.559	1.190
Costs	24.9	15.6	7.295	.007	0.557	7.3	9.1	0.560	.454	1.271
Social status	12.0	30.2	25.243	<.001	3.178	11.6	10.1	0.321	.571	0.851
Professional identity	11.2	40.9	58.116	<.001	5.657	22.3	14.6	5.355	.021	0.608
Quality of care	30.0	49.4	20.437	<.001	2.274	41.2	20.8	26.563	<.001	0.361
Self-competence	6.4	42.9	88.911	<.001	10.900	12.4	22.7	9.378	.002	2.069
Work barriers	6.9	8.4	0.459	.498	1.250	8.6	21.8	17.048	<.001	2.961
Task variation	27.9	71.1	99.302	<.001	6.360	7.3	1.6	10.942	.001	0.210
Job enrichment	34.8	46.4	7.439	.006	1.626	10.7	4.2	8.605	.003	0.367
Flexible collaboration	50.2	46.8	0.636	.425	0.871	2.1	1.9	0.026	.872	0.906
Other	4.7	3.9	0.222	.638	0.818	7.3	11.7**	2.896	.089	1.682

\*dental hygienist=1, df=1; \*\*4.9% of dental hygienists have similar answers: 'an extended scope of practice is a threat to dental hygiene core business'

*Explanatory variables supporting an extended scope of dental hygiene practice*

Table 4 shows the odds ratios from the binary logistic regression including the lower and upper confidence intervals. Six factors were used to explain the reasons for supporting an extended scope of dental hygiene practice.

**Table 4**

Odds ratios (and lower and upper confidence intervals) of binary logistic regression after BIC model selection for reasons to support an extended scope of dental hygiene practice

Reasons to support extended scope	Explanatory factors					
	Type of profession <sup>a</sup>	Gender <sup>b</sup>	Age <sup>c</sup>	Old or new style <sup>d</sup>	Work experience <sup>e</sup>	Working hours <sup>f</sup>
Income	4.18 (1.96,10.11)	0.26 (0.11, 0.58)	-	-	-	-
Costs	-	0.50 (0.32, 0.78)	-	-	-	-
Social status	4.36 (2.61, 7.52)	-	1.10 (1.03, 1.16)	-	0.91 (0.86, 0.96)	-
Professional identity	15.26 (6.42, 45.34)	0.26 (0.09, 0.66)	-	-	-	-
Quality of care	6.02 (3.27, 12.03)	0.25 (0.12, 0.48)	-	-	-	-
Self-competence	34.76 (11.87, 150.25)	0.22 (0.05, 0.67)	-	-	-	-
Work barriers	-	-	-	-	-	-
Task variation	6.41 (4.38, 9.48)	-	-	-	-	1.02 (1.01, 1.04)
Job enrichment	1.61 (1.13, 2.30)	-	-	1.88 (1.15, 3.09)	-	-
Flexible collaboration	-	-	-	2.01 (1.23, 3.35)	-	-
Other	-	-	1.05 (1.01, 1.10)	-	-	-

a= dental hygienist; b=female; c=older; d=new style practitioners (graduated in or after 2006 when extended scope was incorporated in Dutch curricula); e=more years of work experience; f=more working hours per week; (95% lower confidence interval, 95% upper confidence interval)



Self-competence, professional identity, task variation, and quality of care were reasons to support an extended scope of dental hygiene practice and were explained by profession. Self-competence is mentioned almost 35 times more often by dental hygienists than dentists. Dental hygienists perceived self-competence as a reason to support an extended scope between at least eleven times and, at most, one hundred fifty times more often than dentists. Dental hygienists mentioned professional identity fifteen times more often compared to dentists. Dental hygienists perceived professional identity between at least six and, at most, forty-five times more important than dentists when supporting this policy. Besides self-competence and professional identity, dental hygienists considered task variation and quality of care as most important compared to dentists when supporting an extended scope.

Costs, income, professional identity, quality of care, and self-competence as reasons to support an extended scope of dental hygiene practice were explained by gender. It was more likely that a male rather than a female would perceive costs as a reason to support an extended scope of practice. Male practitioners perceived costs between at least one and a half times and, at most, nine times more important than those that were female. Male practitioners were four times more likely to report income, professional identity, quality of care, and self-competence as a reason to support an extended scope of dental hygiene practice. Lower and upper confidence intervals ranged from approximately one and a half to twenty times where men reported these reasons more often than women.

To the new style dentists and dental hygienists, flexible collaboration was more important compared to the old style practitioners. They also considered flexible collaboration a benefit of an extended scope of dental hygiene practice.

#### *Explanatory variables opposing an extended scope of dental hygiene practice*

Table 5 depicts the odds ratios of a binary logistic regression including the lower and upper confidence intervals. Six factors were used to explain reasons to oppose an extended scope of dental hygiene practice.

**Table 5** Odd ratios (and lower and upper confidence intervals) of binary logistic regression after BIC model selection for reasons to oppose an extended scope of dental hygiene practice

Reasons to oppose extended scope	Explanatory factors					
	Type of profession <sup>a</sup>	gender <sup>b</sup>	age <sup>c</sup>	old or new style <sup>d</sup>	work experience <sup>e</sup>	working hours <sup>f</sup>
Income	-	-	-	-	-	-
Costs	-	-	-	-	-	-
Social status	-	-	-	-	-	0.96 (0.92, 0.99)
Professional identity	-	-	-	-	-	-
Quality of care	0.36 (0.24, 0.53)	-	-	-	-	-
Self-competence	-	-	0.89 (0.82, 0.94)	-	1.13 (1.05, 1.22)	-
Work barriers	2.96 (1.77, 5.17)	-	-	-	-	-
Task variation	0.22 (0.07, 0.58)	-	-	-	-	-
Job enrichment	-	0.34 (0.18, 0.67)	-	-	-	-
Flexible collaboration	-	-	-	-	-	-
Other	-	-	-	-	-	-

a= dental hygienist; b=female; c=older; d=new style practitioners (graduated in or after 2006 when extended scope was incorporated in Dutch curricula); e=more years of work experience; f=more working hours per week; (95% lower confidence interval, 95% upper confidence interval)

Quality of care, task variation, and work barriers as reasons to oppose an extended scope of dental hygiene practice were explained by profession. Quality of care was more important to dentists compared to dental hygienists as a reason to oppose an extended scope of practice. Perception regarding quality of care was at least two times and, at most, four times more important to dentists than to dental hygienists. Task variation was approximately four and a half times more important to dentists as a reason to oppose this policy. This perception regarding task variation was at least one and a half times and, at most, fourteen times more important to dentists than to dental hygienists. To dental hygienists, work barriers are almost three times more often a reason to oppose an extended scope of practice. This perception regarding work barriers was at least one and a half times and, at most, fourteen times more important to dental hygienists than to dentists. Job enrichment was almost three times more important to men compared to women. This perception regarding job enrichment was at least one and a half times and, at most, five and a half times more important to men than to women.

*Differences among dentists and dental hygienists: old or new style and age categories*

Dentists that graduated before 2006 were more supportive of an extended scope of dental hygiene practice regarding quality of care ( $p=.010$ ) compared to new style dentists. Age was also associated with reasons to support or oppose this extended scope policy. Especially older dentists were more likely to report income as a reason to support the extended scope of practice ( $p=.023$ ). They also supported social status ( $p=.005$ ), quality of care ( $p<.001$ ), professional identity ( $p=.003$ ), task variation ( $p=.029$ ), and self-competence ( $p=.042$ ) more often but were opposed to this policy with regard to costs ( $p=.014$ ) and job enrichment ( $p=.009$ ). Especially younger dentists reported quality of care ( $p=.011$ ) as a reason to oppose an extended scope of practice.

Dentists who graduated before 2006, i.e., the old style dentists, reported additional reasons for supporting an extended scope of dental hygiene practice. Six of those dentists reported that this policy would improve the organization of oral health care (2.6%). Two dentists reported that it would improve the job satisfaction of dental hygienists (0.9%). Additional reasons to oppose this policy were related to the lack of competence of dental hygienists (four dentists, 1.7%), lack of clarity to patients (four dentists, 1.7%), control of dentists over the dental hygienist (five dentists, 2.1%), and a diminish scope of dental practice (one dentist, 0.04%).

New style dental hygienists reported social status ( $p=.013$ ) more often as a reason to support an extended scope of practice. Quality of care ( $p=.044$ ), professional identity ( $p=.008$ ), flexible collaboration ( $p=.002$ ), job enrichment ( $p=.001$ ), task variation ( $p=.003$ ), and self-competence ( $p=.003$ ) were also reasons generally reported by these new style dental hygienists. Old style dental hygienists more often reported quality of care ( $p=.010$ ) as a reason to oppose an

extended scope of dental hygiene practice. The age of dental hygienists was associated with their reason to oppose this policy. Especially older dental hygienists reported professional identity ( $p=.048$ ) as a reason to oppose it.

Extending the scope of practice as a threat to the core business of the dental hygienist was an additional reason reported by old style dental hygienists to oppose the policy (13 (4.2%)). Another reason was that especially old style dental hygienists were afraid that this policy would negatively influence the relationship between dentists and dental hygienists (two dental hygienists, 0.6%). A lack of training or qualification (five dental hygienists, 1.6%) was especially reported by old style dental hygienists (dental hygienists with two or three years of training).

## **Discussion**

Dentists and dental hygienists convey different reasons to support or oppose an extended scope of dental hygiene practice. Reasons can be categorized as economic, professional status, quality, job satisfaction, and flexible collaboration. Reasons were mostly explained by profession, gender, and old or new style (practitioners trained before or after the introduction of this policy). Dentists and dental hygienists have opposing opinions regarding task variation, professional identity, quality of care, and job enrichment.

Economic issues were explained by profession and gender and were only considered as reasons to support an extended scope of dental hygiene practice. It was more likely that a dental hygienist would perceive income as a positive reason to extend it. Obviously, additional certain dental tasks can provide additional income. Costs, but especially income, were more important to male practitioners when supporting an extended scope of practice. These perceptions also correspond to career perceptions of male students. This finding supports earlier studies that substantiated that economic motives are more dominant in the career choices of male practitioners (Rashid et al., 2013; Scarbecz & Ross, 2002).

Social status and professional identity were explained by profession and gender and only considered as reasons to support the extended scope of practice. Both are perceived by dental hygienists as more important compared to dentists. This most likely refers to acquiring a full professional status and public acceptance (Gillis, & Praker, 1996) which is a predictable desire of members of a professionalizing occupation (Macdonald, 1995). Dental hygienists are legally recognized in many countries, however, not in some EU Members States and by EU law. Additionally, the development of dental hygiene from an auxiliary to a profession has been opposed by dental associations (Luciak-Donsberger & Eaton, 2009). In our study, professional identity was also more important to men compared to women. This corresponds

with available evidence. Men generally have a stronger professional identification compared to women due to gender related cultural socialization (Lee, Pillutla & Law, 2000; Russ & McNeilly, 1995; Wallace, 1995). Moreover, professional identity is more salient in the intrapersonal social identity hierarchy of men compared to women (Fox & Bruce, 2001; Gaunt & Scott, 2014). Male dental hygienists might also experience societal gender discrimination and have feelings of not belonging to the dental hygiene profession. This was found in a study regarding the experiences of male dental hygienists following graduation (Faust, 1999). Acceptance of the dental hygiene occupation as a profession might change the auxiliary and assistant reputation of the dental hygienist and reduce societal stereotypes about the occupations of men and women.

Quality of care was both a reason to support as well as to oppose an extended scope of dental hygiene practice. This was partially explained by profession and gender. Quality of care was a more important reason for dental hygienists to support it compared to dentists. For this supportive reason, there may be several factors responsible. The main quality of care indicators concern effectiveness, safety, and patient centeredness (Carinci et al., 2015). Certain dental tasks such as local anesthesia and the use of radiographs can enhance the quality of periodontal care by dental hygienists. Furthermore, dentists and dental hygienists who share diagnostic tasks could potentially increase patient safety. Finally, sharing certain dental tasks could also enhance flexible collaboration in general; something that is explicitly reported by many dentists and dental hygienists that participated in this study. Quality of care as a reason to oppose this policy could be grounded in dentists' beliefs regarding the effectiveness of dental hygienists that they are not competent enough to perform certain dental tasks (Morison, & Machniewski, 2011; Hillam, 2008; Ross, 2008). Dentists are often not aware of dental hygiene education and the required competences (Bolk, Kroezen & Van Dam, 2003). Therefore, they overestimate patient concerns about who is delivering the dental care (Cockcroft, 2015; Holden, 2012). However, several studies report positive results regarding the competence of dental hygienists (Brocklehurst, Ashley, Walsh & Tickle, 2012; Daniel & Kumar, 2016; Macey et al., 2015; Post & Stoltenberg, 2014; Richards, 2015; Öhrn, Crossner, Börgesson & Taube, 1996), and patients are satisfied with the care they provided (DeAngelis & Goral, 2000; Edgington & Pimlott, 2000; Jackson, 2015). It is more likely that some dentists perceive the professionalizing dental hygienist as a financial threat (Kravitz & Treasure, 2007; Luciak-Donsberger, 2003; Pourat, 2009; Reitz & Jadeja, 2004) instead of a threat to the quality of care as many dentists delegate certain dental tasks to chair-side assistants who have no formal or qualifying process of education.

Dentists older than 60 years are less likely to be practice owners than younger dentists (McKay et al., 2016). The results of our study show that older dentists are more supportive of this policy. The older dentists report six reasons in favor of this policy and only two against it. In our study, older dentists were slightly underrepresented in our sample compared to the

target population of all Dutch dentists. Therefore, it is likely that more dentists support an extended scope of dental hygiene practice than our study has revealed. In several countries, many dentists support it (Reinders et al., 2017a), and dental hygienists actually perform a wider range of certain dental tasks (Hach, Aaberg, Lempert & Danielsen, 2016). Independent of age, especially dentists in large group practices and those with prior experience with an extended scope of practice delegate at a higher rate and have perceptions that are more positive regarding an extended scope of practice (Blue et al., 2013).

Besides age category, other demographic characteristics of dentists can also be positively related such as practice size and a preventive treatment philosophy of dentists (Bruers, Van Rossum, Felling, Truin & Van 't Hof, 2003). In our study sample, dentists who own a practice are slightly underrepresented compared to the target population of Dutch dentists. This can perhaps distort the perceived importance of business related issues such as income and costs. It is likely that our results are an underestimation of the relative importance of these reasons of dentists to support or oppose an extended scope of dental hygiene practice. Economic motives of dentists to support this policy can be related to the desire to expand their business (Kempster et al., 2015; Pourat, 2009; Hopcraft et al., 2008).

Job satisfaction related reasons including work barriers, task variation, and job enrichment (Hackman & Oldham, 2005) were found especially among dental hygienists and, to a lesser degree, among dentists. The perception of experienced work barriers was more likely to be reported by dental hygienists. This corresponds with previous research that revealed a perceived lack of dental hygiene autonomy to perform certain dental tasks (Jerković-Ćosić et al., 2012). Task variation is a predictor of dental hygienists' job satisfaction and, in our study, is also a reason for them to support this policy. However, task variation through an extended scope of dental hygiene practice may be less desirable for those who have several part-time jobs (Van Offenbeek, Jerković, Weening-Verbree, Schaub & Van Kampen, 2010). In contrast, task variation or the reduction of it is a reason for dentists to oppose the policy. Thus, both oral health care professions seem to perceive certain dental tasks as contributing to their own job satisfaction.

Male practitioners report job enrichment more often as a reason to oppose the policy. Job enrichment is associated with responsibility, independence, and control (Uduji, 2013). Perhaps such job characteristics are relatively more important to male practitioners than female practitioners because men are more focused on career advancement whereas women are more likely to take a career break (McKay et al., 2016; Pallavi & Rajkumar, 2011). However, this explanation does not seem very plausible.

Flexible collaboration was more likely to be reported by the new style of practitioners but was also the most reported reason of all practitioners independent of their professional

background. Those that graduated in or after 2006 were more likely to perceive flexible collaboration as a reason to support this policy. Since this group has not been included in any other study regarding an extended scope of dental hygiene practice, it is difficult to identify why this new group of graduated practitioners is more supportive. Perhaps it is because they are socialized in a new way of thinking as introduced in the renewed Dutch curricula. Interprofessional education can also reduce dentist-centric perceptions of students regarding task distribution between dentists and dental hygienists (Reinders et al., 2017b). This would also emphasize the important role of undergraduate training in changing clinical practice. An extended scope of dental hygiene practice can improve the overall efficiency in oral health care (Richardson, 1999) as it allows more than one profession to perform specific tasks and treatments. This also affirms the claim of Bassoff (1983) that task profiles that overlap in health care teams facilitate flexibility.

Some - especially old style - Dutch dental hygienists spontaneously reported that an extended scope of dental hygiene practice is a threat to their core business. This may imply that an extended scope creates two different identities within a single occupation. However, it is likely that the changing ratio between old and new style dental hygienists will also influence the acceptance of this policy in favor of an extended scope. Additional research is required to explore the potential contradictory effect of an extended scope of dental hygiene practice on the identity formation of dental hygienists.

The response rate of this study was relatively low thus posing a potential threat to the study's representativeness. However, survey response rates have been declining for several decades (Cull, O'Connor, Sharp & Tang, 2005) and there is no scientifically proven minimally acceptable response rate (Johnson & Wislar, 2012). The non-response analysis of this study did not show any differences between first responders and those who responded after a reminder. In addition, the analysis of the representativeness of this study showed that the samples of dentists and dental hygienists were representative with regard to most characteristics compared to the target populations. Demographic representativeness of studies with much lower response rates only slightly differ from studies with high response rates (Holbrook, Krosnick & Pfent, 2008). The representativeness of collected data exceeds the importance of the quantity of collected data.

Since the data of this study is four years old, our findings might perhaps be different or invalid than if the survey was carried out more recently. However, in a meta-analysis regarding attitudes towards an extended scope among dentists and dental hygienists, the publication year did not explain differences in attitudes (Reinders et al., 2017a). In other words, the perceptions of this population would probably not have changed drastically during the last four years.

The sample size in our study was relatively small and was determined by the contact information that was made available by the two Dutch professional associations. We included the maximum numbers of dentists and dental hygienists that were made available to us. A power calculation would have been informative if previous research would have been available to provide true proportions. Therefore, a power calculation would become speculative. This also reflects the exploratory nature of our study. The absolute sample size of 541 professionals is large when considering statistical power.

In our survey, closed-ended questions with predefined reasons to support or oppose the policy were combined with open-ended questions. Open-ended questions allow respondents to answer freely in their own words. On the other hand, respondents can have difficulties properly articulating their own opinions which can explain why these types of questions are prone to low item-response rates (Denscombe, 2008). Since several old style dental hygienists spontaneously reported that an extended scope of practice is a threat to the dental hygiene core business, it is likely even more Dutch dental hygienists that graduated before 2006 will share this opinion.

### **Conclusion**

Flexible collaboration was found to be the most supportive reason for extended practice according to all of the practitioners that participated in this study. Quality of care was a supportive reason of dental hygienists while dentists reported this as a reason to oppose an extended scope. Job satisfaction related reasons were reported by dental hygienists in support of an extended scope.

### **Acknowledgements**

This study did not receive any funding. The authors have nothing to disclose and have no commercial or other relationships that could constitute a conflict of interest.



## References

- Abelsen, B. & Olsen, J.A. (2008) Task division between dentists and dental hygienists in Norway. *Community Dentistry and Oral Epidemiology*, 36(6), 558-566.
- Adams, T. (1999). Dentistry and medical dominance. *Social Science & Medicine*, 48, 407-420.
- Adams, T.L. (2004). Attitudes to independent dental hygiene practice: dentists and dental hygienists in Ontario. *Journal Canadian Dental Association*, 70(8) 535-538.
- Bassoff, B.Z. (1983). Interdisciplinary Education as a Facet of Health Care Policy: The Impact of Attitudinal Research. *Journal of Allied Health*, 3, 280-286.
- Battrell, A. (2012). Looking at the past to see the future: the role of the dental hygienist in collaborating with dentists to expand and improve oral health care. *Journal of the American College of Dentists*, 79(1), 29-32.
- Blue, C.M., Funkhouser, D.E., Riggs, S., Rindal, D.B., Worley, D., Pihlstrom, D.J., Benjamin, P., Gilbert, G.H. & National Dental PBRN Collaborative Group. (2013). Utilization of non-dentist providers and attitudes toward new provider models: findings from the National Dental Practice-Based Research Network. *Journal of Public Health Dentistry*, 73, 237-244.
- Bolk, M.H., Kroezen, N.M., & Van Dam, B.A. (2003). [Dental professionals in the future: flexible team players. The vision of dental professionals on future professional structure and occupation]. *Nederlands Tijdschrift voor Tandheelkunde*, 110(7), 289-293. *Dutch*
- Brocklehurst, P., Ashley, J., Walsh, T., & Tickle, M. (2012). Relative performance of different dental professional groups in screening for occlusal caries. *Community Dentistry and Oral Epidemiology*, 40(3), 239-246.
- Bruers, J.J., Van Rossum, G.M., Felling, A.J., Truin, G.J., & Van 't Hof, M.A. (2003). Business orientation and the willingness to distribute dental tasks of Dutch dentists. *International Dental Journal*, 53(4), 255-263.
- Capaciteitsorgaan (2013). *Capaciteitsplan 2013. Voor de medische, tandheelkundige, klinisch technologische en aanverwante (vervolg)opleidingen*. Utrecht: Stichting Capaciteitsorgaan voor Medische en Tandheelkundige Vervolgopleidingen. *Dutch*
- Carinci, F., Van Gool, K., Mainz, J., Veillard, J., Pichora, E.C., Januel, J.M., Arispe, I., Kim, S.M., Klazinga, N.S. & OECD Health Care Quality Indicators Expert Group. (2015). Towards actionable international comparisons of health system performance: expert revision of the OECD framework and quality indicators. *International Journal for Quality in Health Care*, 27(2), 137-146.
- Chang, A.A., Heskett, K.M., & Davidson, T.M. (2006). Searching the literature using medical subject headings versus text word with PubMed. *Laryngoscope* 116(2), 366-340.
- Cockcroft, B. (2015). Dentists overestimate patient worries about who's delivering their dental care. *British Dental Journal*, 218(9), 510.
- Cull, W.L., O'Connor, K.G., Sharp, S., & Tang, S.F. (2005). Response rates and response bias for 50 surveys of pediatricians. *Health Services Research*, 40(1), 213-226.

- Daniel, S.J. & Kumar, S. (2016). Comparison of dental hygienists and dentists: clinical and teledentistry identification of dental caries in children. *International Journal of Dental Hygiene*. [Epub ahead of print]
- DeAngelis, S. & Goral, V. (2000). Utilization of local anesthesia by Arkansas dental hygienists, and dentists' delegation/satisfaction relative to this function. *International Journal of Dental Hygiene*, 74(3) 196-204.
- Denscombe, M. (2008). The length of responses to open-ended questions. A comparison of online and paper questionnaires in terms of a mode effect. *Social Science Computer Review*, 26(3), 359-368.
- Edgington, E. & Pimlott, J. (2000). Public attitudes of independent dental hygiene practice. *Journal of Dental Hygiene*, 74(4), 261-270.
- Faust, C.C. (1999). A qualitative study of male dental hygienists' experiences after graduation. *Journal of Dental Hygiene*, 73(3), 141-148.
- Fortner, H.S. (2008). A CDT code for hygienists. *RDH Magazine*, 28-33.
- Fox, G.L. & Bruce, C. (2001). Conditional fatherhood: Identity theory and parental investment theory as alternative sources of explanation of fathering. *Journal of Marriage and Family*, 63, 394-403.
- Gaunt, R. & Scott, J. (2014). Parents' involvement in childcare: Do parental and work identities matter? *Psychology of Women Quarterly*, 38, 475-489.
- Gibson-Howell, J.C. & Hicks, M.J. (2010). Dental Hygienists' Role in Patient Assessments and Clinical Examinations in U.S. Dental Practices: A Review of the Literature. *Journal of Allied Health* 39(1), e1-e6.
- Gillis, M.V. & Praker, M.E. (1996). The professional socialization of dental hygienists: from dental auxiliary to professional colleague. *NDA Journal*, 47(1), 7-13.
- Gorter, R.C. & Freeman, R. (2005). Dentist-assistant communication style: perceived gender differences in The Netherlands and Northern Ireland. *Community Dentistry and Oral Epidemiology*, 33, 131-140.
- Hach, M., Aaberg, K.B., Lempert, S.M., & Danielsen, B. (2016). Work assignments, delegation of tasks and job satisfaction among Danish dental hygienists. *International Journal of Dental Hygiene*, 1-7.
- Hackman, J.R. & Oldham, G.R. (2005). *How job characteristics theory happened. The Oxford handbook of management theory: The process of theory development*. Oxford, UK: Oxford University Press.
- Hillam, D.G. (2008). Silent revolution. *British Dental Journal*, 204(1), 4-5.
- Holbrook, A.L., Krosnick, J.A., & Pfent, A. (2008). The Causes and Consequences of Response Rates in Surveys by the News Media and Government Contractor Survey Research Firms. In J.M. Lepkowski, C. Tucker, J.M. Brick, E. De Leeuw, L. Japac, P.J. Lavrakas, M.W. Link, & R.L. Sangster (Eds.), *Advances in telephone survey methodology*. (pp. 499-678). New York: Wiley.
- Holden, A.C.L. (2012). No To Direct Access. *British Dental Journal*, 212, 355.
- Hopcraft, M., McNally, C., Ng, C., Pek, L., Pham, T.A., Phoon, W.L., Poursoltan, P., & Yu, W. (2008). Attitudes of the

Victorian oral health workforce to the employment and scope of practice of dental hygienists. *Australian Dental Journal*, 53(1), 67-73.

Isman, B.A. & Farrell, C.M. (2014). Are dental hygienists prepared to work in the changing public health environment? *Journal of Evidence-Based Dental Practice*, 14, 183-190.

Jackson, G. (2015). Placement of preformed metal crowns on carious primary molars by dental hygiene/therapy vocational trainees in Scotland: a service evaluation assessing patient and parent satisfaction. *Primary Dental Journal*, 4(4), 46-51.

Jerkovic, K., Van Offenbeek, M.A.G, Slot, D.E., & Van Der Schans, C.P. (2010). Changes in the professional domain of Dutch dental hygienists. *International Journal of Dental Hygiene*, 8(4), 301-307.

Jerković-Ćosić, K., Van Offenbeek, M.A.G., & Van der Schans, C.P. (2012). Job satisfaction and job content in Dutch dental hygienists. *International Journal Dental Hygiene*, 10(3), 155-162.

Johnson, T.P. & Wislar, J.S. (2012). Response rates and nonresponse errors in surveys. *Journal of the American Medical Association*, 307(17), 1805-1806.

Jongbloed-Zoet, C., Bol-van den Hil, E.M., La Rivière-Ilsen, J., & Van der Sanden-Stoelinga, M.S. (2012). Dental hygienists in The Netherlands: the past, present and future. *International Journal of Dental Hygiene*, 10(3), 148-154.

Kempster, C., Luzzi, L. & Roberts-Thomson, K. (2015). Australian dentists: characteristics of those who employ or are willing to employ oral health therapists *Australian Dental Journal*, 60(2), 154-162.

Kravitz, A.S. & Treasure, E.T. (2007). Utilisation of dental auxiliaries - attitudinal review from six developed countries. *International Dental Journal* 57(4), 267-273.

Lee, C., Pillutla, M., & Law, K.S. (2000). Power-distance, gender, and organizational justice. *Journal of Management*, 26, 685-704.

Luciak-Donsberger, C. (2003). Origins and benefits of dental hygiene practice in Europe. *International Journal of Dental Hygiene*, 29-42.

Luciak-Donsberger, C. & Eaton, K.A. (2009). Dental hygienists in Europe: trends towards harmonization of education and practice since 2003. *International Journal of Dental Hygiene*, 7(4), 273-284.

Macdonald, K.M. (1995). *The Sociology of the Professions*. London: Sage.

Macey, R., Glenny, A., Walsh, T., Tickle, M., Worthington, H., Ashley, J., & Brocklehurst, P. (2015). The efficacy of screening for common dental diseases by hygiene-therapists: a diagnostic test accuracy study. *Journal of Dental Research*, 94(3), 70S-78S.

McKay, J.C., Ahmad, A., Rashid, F., Shaw, J.L., Clancy, A., David, C., Figueiredo, R., & Quiñonez, C. (2016). Gender Differences and Predictors of Practice Ownership in a Sample of Ontario Dentists. *Journal Canadian Dental Association*, 82, g27.

Morison, S., Marley, J., & Machniewski, S. (2011). Educating the dental team: exploring perceptions of roles and identities.

*British Dental Journal*, 211(10), 477-483.

Northcott, A., Brocklehurst, P., Jerković-Ćosić, K., Reinders, J.J., McDermott, I., & Tickle, M. (2013). Direct access: lessons learnt from the Netherlands. *British Dental Journal*, 215(12), 607-610.

Öhrn, K., Crossner, C.G., Börgesson, I., & Taube, A. (1996). Accuracy of dental hygienists in diagnosing dental decay. *Community Dentistry and Oral Epidemiology*, 24(3), 182-186.

Pallavi, S.K. & Rajkumar, G.C. (2011). Professional practice among woman dentist. *Journal of International Society of Preventive and Community Dentistry*, 1(1), 14-19.

Post, J.J. & Stoltenberg, J.L. (2014). Use of restorative procedures by allied dental health professionals in Minnesota. *Journal of the American Dental Association*, 145(10), 1044-1050.

Pourat, N. (2009). Differences in characteristics of California dentists who employ dental hygienists and those who do not. *Journal of the American Dental Association*, 140(8), 1027-1035.

Rashid, H., Manoharan, A., Abufanas, S., & Gallagher, J.E. (2013). Motivation for a career in dentistry: the views of dental students in the United Arab Emirates. *International Dental Journal*, 63(5), 259-65.

Reinders, J.J., Krijnen, W.P., Onclin, P., Van der Schans, C.P., & B. Stegenga, B. (2017a). Attitudes among dentists and dental hygienists towards extended scope and independent practice of dental hygienists. *International Dental Journal* 67(1), 46-58.

Reinders, J.J., Krijnen, W.P., Stegenga, B., & Van der Schans, C.P. (2017b). Perceived Dentist and Dental Hygienist Task Distribution After Dental and Dental Hygiene Students' Team Intervention. *Journal of Dental Education*, 81(4), 413-419.

Reitz, M. & Jadeja, R. (2004). The collaborative practice of dental hygiene. *International Journal of Dental Hygiene*, 2(1), 36-39.

Richards, D. (2015). Hygiene-therapists could be used to screen for dental caries and periodontal disease. *Evidence Based Dentistry*, 16(4), 116-117.

Richardson, G. (1999). Identifying, evaluating and implementing cost-effective skill mix. *Journal of Nursing Management*, 5, 265-270.

Ross, M.K. (2008). Hygienist-therapist remit. *British Dental Journal*, 204(3), 110-111.

Ross, M.K., Ibbetson, R.J., & Turner, S. (2007). The acceptability of dually-qualified dental hygienist-therapists to general dental practitioners in South-East Scotland. *British Dental Journal*, 202: E8.

Russ, F.A. & McNeilly, K.M. (1995). Links among satisfaction, commitment, and turnover intentions: The moderating effect of experience, gender, and performance. *Journal of Business Research*, 34, 57-65.

Scarbecz, M. & Ross, J.A. (2002). Gender differences in first-year dental students' motivation to attend dental school. *Journal of Dental Education*, 66(8), 952-961.

Sibbald, B., Laurant, M., & Scott, A. (2006). Changing task profiles. In A. Altman, A. Rico, & W. Boerma (Eds.), *Primary*

*care in the driver's seat? Organizational reform in European primary care.* (pp. 148–164). Maidenhead, England: Open University Press.

Swanson Jaecks, K.M. (2009). Current perceptions of the role of dental hygienists in interdisciplinary collaboration. *Journal of Dental Hygiene*, 83(2), 84-91.

Uduji, J.I. (2013). Job Enrichment: A Panacea to the Problem of the Demotivated Marketing Executives in the Banking Industry in Nigeria. *European Journal of Business and Management*, 5(13), 99-106.

Van Offenbeek, M.A.G., Jerković, K., Weening-Verbree, L., Schaub, R.M.H., & Van Kampen, T.J. (2010). Taakverdeling tussen beroepsgroepen binnen Nederlandse mondzorg praktijken; Groningen: RuG-RHO. *Dutch*

Vick, B. (2015). Career satisfaction of Pennsylvanian dentists and dental hygienists and their plans to leave direct patient care. *Journal of Public Health Dentistry*, 4.

Virtanen, J.I., Pellikka, E., Singh, S., & Widström, E. (2015). The professional role of a dental hygienist in Finland - educators' views. *International Journal Dental Hygiene*, 1-8.

Wallace, J.E. (1995). Organizational and professional commitment in professional and nonprofessional organizations. *Administrative Science Quarterly*, 40, 228-255.



# CHAPTER 4

---

## Minor differences in occupational stereotypes between dental and dental hygienist students

Jan Jaap Reinders

Cees P. van der Schans

Boudewijn Stegenga

**Abstract**

**Objective** – Stereotyping can be a barrier to effective collaboration between different professions and can already be present at the undergraduate level. However, student perceptions of the relationship between dentists and dental hygienists reflected by their occupational stereotypes have not been thoroughly studied.

**Method** – A questionnaire was distributed among a convenience sample of Dutch dental and dental hygiene students in the middle of their training course who have had no prior experience with interprofessional education. Students attributed assertiveness, dominance, and respectfulness to dentists and dental hygienists and to themselves on a scale ranging from 0= ‘does not apply to’ to 5 = ‘totally applies to’.

**Results** – The total response comprised 82% (n=75). Dental and dental hygiene students agreed about all stereotypical characteristics of dentists (assertive, dominant, and respectful; mean=3.5-4.0, SD=0.8-1.6). However, they did not agree about some stereotypical characteristics of dental hygienists except for the dominance of dental hygienists. In addition, dental students only identified with the dominance of dentists ( $r=.382$ ) and not with dental hygienists. In contrast, dental hygiene students perceive overall similarities between themselves and both professions.

**Conclusion** – Only minor differences exist with regard to occupational stereotypes between dental and dental hygiene students. It is possible that the investigated occupational stereotypes are not the only stereotypes relevant to interprofessional collaboration. Furthermore, occupational commitment was not included in the study. This could enhance the predictive value of occupational stereotypes related to interprofessional collaboration. The image-formation by dental students with regard to dental hygienists should be modified.

**Introduction**

In oral health care, dentists and dental hygienists work together and share tasks and responsibilities. Stereotyping can be a barrier to effective collaboration between different professions and can already be present at the undergraduate level (Lewitt, Ehrenborg, Scheja & Brauner, 2010). Exposing, confronting, and dispelling stereotypes during education may be needed to enhance collaboration (Oandasan & Reeves, 2005). However, student perceptions of the relationship between dentists and dental hygienists reflected by their occupational stereotypes have not been thoroughly studied (Snow et al., 2011).

The content of stereotypes typically includes relational aspects (Wilder, 1984). A stereotype is



an indicator of ingroup consensus (Haslam, Turner, Oakes, Reynolds & Doosje, 2002) and an important psychological mechanism for making intergroup distinctions (McGarty, Yzerbyt & Spears, 2002; Tajfel & Turner, 1986). To establish a harmonious intergroup relationship, the ability to make a distinction between one's own professional group (ingroup) and another professional group (outgroup) is essential (Van Knippenberg, 1984; Branscombe, Ellemers, Spears & Doosje, 1999; Zarate & Garza, 2002). This harmony is least threatened when professional groups agree with each other's distinctive characteristics (Hean, Clark, Adams & Humphri, 2006). Negative stereotypes can also result in a lack of intergroup harmony (Branscombe & Wann, 1994) and in negative expectations of outgroup attitudes or behaviors creating a process of self-fulfilling prophecy (Hilton & Von Hippel, 1996) which may have a negative impact on collaboration.

Dental hygiene is a professionalizing occupation while dentistry already has a well-established status (Morison, Marley, Stevenson & Milner, 2008). Even though the task profile of the dental hygienist is changing because of the introduction of task shifting (Johnson, 2009), the occupational stereotypes attached to this profession tend to change slowly (Hean et al., 2006; Castledine, 1996). Recent studies also show a stagnation of task shifting between dentists and dental hygienists (Abelsen & Olsen, 2008; Capaciteitsorgaan, 2010). It is possible that differences in occupational stereotypes may be responsible for this.

Occupational stereotypes could reflect interprofessional inequality. Equality is recognized as a core component of interprofessional collaboration and is required for joint problem-solving (Baker, Egan-Lee, Martimianakis & Reeves, 2011). However, many dentists appear to prefer a hierarchical relationship since they want to maintain power and control and, in general, also want to avoid mutual dependency (Chambers, 2001). This dental dominance may obstruct or limit task shifting to and the autonomy of dental hygienists (Adams, 1999). On the other hand, not all dentists seem to be opposed to the idea of an expanded scope of dental hygiene practice (Abelsen & Olsen, 2008) while most dental hygienists are supportive of an independent and expanded scope of practice (Adams, 2004). However, Adams found attitudinal differences among dental hygienists with respect to gender and attitude towards independent practice. Male dental hygienists were more in favor of professional change and independent practice.

In most countries, the dental hygiene profession is female-dominated while dentistry is primarily dominated by males (Capaciteitsorgaan, 2010; Ayers, Thomson, Rich & Newton, 2008; Ogunbodede, 2004; Luzzi & Spencer, 2011; Bahador, Abdolreza Pazooki & Kabir, 2010; Yuan et al., 2010). The historical domination of a profession by a single gender can lead to masculine or feminine conceptions being integrated into the stereotypes held by particular professional groups (Hallam, 2000) where gender is a predictor of professional identity (Adams & Hean, 2006). Gender influences power perceptions in work relationships since male practitioners are more likely to have a hierarchical work relationship with women

(Batalha, Akrami & Ekkehammar, 2007).

According to a study of Swanson Jaecks (2009), many dental hygienists lack confidence regarding task shifting which could diminish the assertiveness that is essential for interprofessional decision-making (Ruble & Thomas, 1976). Team member status is related to professional hierarchy in terms of the ability to challenge the opinions of others and to gain attention and respect for one's own views (Thylefors, Price, Persson & Von Wendt, 2000). Respect is conditional for intergroup harmony and implies the recognition, interdependence, and knowledge of the complementary contributions of members in different professions within a team (Mariano, 1989; Satin, 1994; Siegler & Whitney, 1994; Jones & Way, 1997). A certain degree of interprofessional hierarchy is reflected by student perceptions and stereotypes. The impressions of dental students tend to be dentist-centric with regard to the provision of treatment (Ross, Turner & Ibbetson, 2009). Even more so, dental students perceive dental hygienists as "assistants of dentists" while dental hygiene students believe themselves to be independent professionals (Morison et al., 2008). Before participating in interprofessional education (IPE), dental students especially attribute affiliative characteristics to dental hygiene students while dental hygiene students attribute dominant characteristics to dental students (Reinders & Blanksma, 2012). The attributed social image of these student groups mostly corresponded with their self-image. However, it is not yet clear to what degree student perceptions with regard to dentist and dental hygienist occupational stereotypes are also related to their professional self-image as interprofessional education within dentistry and oral health has not been thoroughly studied (Morison et al., 2008).

The purpose of this study was to determine to what degree student perceptions of dentist and dental hygienist occupational stereotypes (assertiveness, dominance, and respectfulness) are different and to what degree they identify with these occupational stereotypes. Additionally, the relationship between gender and occupational stereotypes was investigated.

### **Materials and methods**

A questionnaire was distributed among a convenience sample of Dutch dental and dental hygiene students in the middle of their training course who had no prior experience with interprofessional education. These students were required to work together for the first time in an educational setting. The questionnaire concerned three social characteristics that are provisional (assertiveness and respectfulness) or a barrier (dominance) for interprofessional collaboration.

#### *Definitions and operationalizations*

Stereotyping is defined as the attribution of certain personal characteristics, attitudes, and

behaviors to a certain group (Cinnirella, 1997) and was operationalized by the evaluation of three adjectives: assertiveness, dominance, and respectfulness as social characteristics belonging to dentists and dental hygienists as professional groups. Statements were assigned a response on a 6-point scale, ranging from 0= 'does not apply to' to 5 = 'totally applies to'.

The concepts of professional ingroup, professional outgroup, and stereotypical distinctiveness were derived from the social identity theory (Tajfel & Turner, 1979) in which these concepts are described as 'ingroup', 'outgroup', and 'psychological distinctiveness'. An ingroup is the social group to which one is a member and is distinct from an outgroup. In this case, it is dentists versus dental hygienists. Psychological distinctiveness (or stereotypical distinctiveness) is the distinctiveness of an ingroup in contrast to an outgroup. The professional ingroup was operationalized as the professional group of which the respondent is becoming a member while the professional outgroup concerned the other professional group, i.e., either dentists or dental hygienists. Statements were assigned a response on a 6-point scale ranging from 0 = 'does not apply to' to 5 = 'totally applies to'. The stereotypical distinctiveness was operationalized as the absolute distinctiveness between the professional ingroup and the professional outgroup of which the scores ranged from 0 = 'no distinctiveness' to 5 = 'very strong distinctiveness'.

The professional self-image of students was defined as 'an individual's self-definition as a member of a profession' which is based on the definition of Chreim, Williams, and Hinings (2007). It was operationalized as the degree to which the respondents attribute assertiveness, dominance, and respectfulness to themselves. Statements with regard to the three adjectives were assigned a response on a 6-point scale, ranging from 0 = 'does not apply to' to 5 = 'totally applies to'.

Professional identification was defined as 'a type of social identification and is the sense of oneness individuals have with a profession (e.g., dentistry, dental hygiene) and the degree to which individuals define themselves as profession members' (Ashforth & Mael, 1989). It was operationalized by the degree to which the professional self-image of the respondent is associated to the professional ingroup and the professional outgroup.

#### *Organization of data collection*

The completion of all of the questionnaires was done in ten mixed groups of students who were in the middle of their professional training. In total, 58 dental students (stage three) and 34 dental hygiene students (stage two) were approached to voluntarily fill in the questionnaire in their first interprofessional training course at the Center for Dentistry and Oral Hygiene, University Medical Center Groningen, the Netherlands. The anonymous questionnaires were returned in sealed envelopes.

*Statistical analyses*

A Chi<sup>2</sup>-test and an ANOVA were used to explore differences between student groups regarding gender distribution and age. Differences between dental and dental hygiene students regarding occupational stereotypes and stereotypical distinctiveness between dentists and dental hygienists were calculated with an ANOVA. Identification of students with occupational stereotypes was analyzed by the degree of association between the ordinal measurements (items) and was estimated by Kendall's tau correlation coefficients (Howell, 1997; Alvo, Cabilio & Feigin, 1982). A power of .80 or higher is considered desirable (Cohen, 1992) to prevent rejection of the null hypothesis when the alternative hypothesis is actually true. Therefore, based on a sample size of 75 and probability of Type I Error (alpha) of .05, a correlation should be at least .285. A p-value of < 0.05 was considered significant.

**Results**

The total responses equaled 82% (n=75) of which 63% (n=47) consisted of dental students and 37% (n=28) of dental hygiene students. One third of all of the respondents was male (33.3%, n=25). Gender distributions between the dental and dental hygiene group differed significantly (p =.001). Of all of the dental students, 46.8% (n=22) was male compared to 10.7% (n=3) male dental hygiene students. The mean (sd) age of all students was 22.5 (2.3) years. No significant difference (p=.080) was determined between dental students and dental hygiene students with regard to age.

*Descriptive statistics of occupational stereotypes*

Among dental students, a majority (61.7%) perceived a stereotypical distinctiveness with regard to assertiveness. This was also the impression of a clear majority (68.0%) of male students. The majority (82.7%) of both dental (89.4%) and dental hygiene (71.4%) students perceived some degree of stereotypical distinctiveness between dentists and dental hygienists with regard to dominance. In addition, the majority of both male (88%) and female (80%) students shared this perception. To the majority of both students groups (69.3%), respect was not a distinctive social characteristic between the two professions.

**Occupational stereotypes according to dental and dental hygiene students**

Dental and dental hygiene students agreed about their stereotypical views of dentists (Table 1). On average, they all perceived dentists to be more than moderately assertive, dominant, and respectful. They also reached consensus about the dominance of dental hygienists who seem to be more submissive. However, dental and dental hygiene students did not agree with the assertiveness (p=.004) and respectfulness (p=.013) of dental hygienists. Dental students perceived dental hygienists as being less assertive and respectful compared to dental hygiene students.

**Table 1.**

Attribution of occupational stereotypes by dental and dental hygiene students (n=75)

Social stereotypes of dentists	According to students dentistry (n=47)		dental hygiene (n=28)		ANOVA		
	M	SD	M	SD	F	df	p
Assertive	3.6	0.9	3.9	1.3	.746	1	.391
Dominant	3.8	1.1	3.5	1.6	.945	1	.334
Respectful	3.9	0.8	4.0	1.1	.395	1	.532
<b>dental hygienists</b>							
Assertive	2.6	1.1	3.4	1.1	8.660	1	.004
Dominant	1.8	1.0	2.1	1.3	1.550	1	.217
Respectful	4.0	0.8	4.5	0.6	6.427	1	.013

(\*0 = 'does not apply to' to 5 = 'totally applies to')

**Stereotypical distinctiveness between dentists and dental hygienists**

With the exception of respectfulness, dental and dental hygiene students perceived a stereotypical distinctiveness between dentists and dental hygienists (Table 2). According to dental students, assertiveness and dominance are more distinctive characteristics than dental hygiene students believe them to be.

**Table 2.**

Stereotypical distinctiveness between dentists and dental hygienists (n=75)

Distinctiveness dentist-dental hygienist	According to students of...				ANOVA		
	dentistry (n=47)		dental hygiene (n=28)		F	df	p
	M	SD	M	SD			
Assertiveness	1.0	1.0	0.6	0.6	4.837	1	0.31
Dominance	2.0	1.2	1.4	1.3	4.442	1	0.38
Respectfulness	0.4	0.6	0.6	1.0	.810	1	.371

(\*\*0 = 'no distinctiveness' to 5 = 'very strong distinctiveness')

*Professional self-image of dental and dental hygiene students*

The self-image of dental and dental hygiene students did not differ significantly with respect to their self-attributed assertiveness (Table 3). However, dental students did attribute more dominance to themselves ( $p=.023$ ) compared to dental hygiene students. In contrast, dental hygiene students did self-attribute more respectfulness compared to dental students ( $p=.017$ ).

**Table 3.**

Professional self-image of dental and dental hygiene students ( $n=75$ )

Social characteristic	Self-image of dental students ( $n=47$ )		dental hygiene students ( $n=28$ )		ANOVA		
	M	SD	M	SD	F	df	p
Assertive	3.2	1.2	3.3	1.2	.008	1	.930
Dominant	3.0	1.2	2.2	1.5	5.357	1	.023
Respectful	4.1	0.7	4.5	0.6	5.987	1	.017

(\*0 = 'does not apply to' to 5 = 'totally applies to')

*Identification with professional ingroup and professional outgroup*

Dental and dental hygiene students mostly identified with their ingroup (Table 4). Even though dental hygiene students perceived dentists to be the most dominant of both professions, they identified most strongly with the lower dominance ( $r=.718$ ,  $p=.000$ ) of dental hygienists.

**Table 4.**

Correlation between ingroup stereotypes and students' professional self-image ( $n=74$ )

Ingroup stereotypes	Professional self-image* dental students	dental hygiene students
Assertiveness	.461, $p=.000$	.509, $p=.002$
Dominance	.382, $p=.002$	.718, $p=.000$
Respectfulness	.680, $p=.000$	.655, $p=.000$

\*Professional identification: Kendall's tau\_b correlation between professional self-image and professional ingroup or outgroup stereotypes on a similar relational aspect. Ingroup = practitioners of one's own profession (dentists or dental hygienists)

On the other hand, dental students only identified with the dominance of dentists (Table 4) and not with dental hygienists (Table 5). The same applied for the lack of dental student identification with the assertiveness of dental hygienists. In contrast, dental hygiene students perceived overall similarities between themselves and both professions.

**Table 5.**  
**Correlation between outgroup stereotypes and students' professional self-image (n=74)**

Outgroup stereotypes	Professional self-image* dental students	dental hygiene students
Assertiveness	.012, p=.884	.573, p=.001
Dominance	.119, p=.322	.386, p=.015
Respectfulness	.565, p=.000	.442, p=.014

\* Professional identification: Kendall's tau\_b correlation between professional self-image and professional outgroup stereotypes on a similar relational aspect. Outgroup = practitioners of another profession (dentists or dental hygienists)

*Occupational stereotypes and identification related to gender*

Gender related differences were ascertained with regard to the assertiveness of dental hygienists (p=.004). Regardless of profession, female students perceived dental hygienists to be more assertive than did the male students. Male students also perceived assertiveness to be a greater distinctive characteristic between dentists and dental hygienists (p=.026). Since the dental student group had a different gender ratio compared to the dental hygiene student group, stereotypical differences could be related to gender instead of professional group. Therefore, a separate analysis was conducted to compare female dental students with female dental hygiene students. No differences between female dental and dental hygiene students were determined with regard to the assertiveness of dental hygienists or assertiveness as a distinctive characteristic between dentists and dental hygienists (n.s.). However, female dental students perceived dental hygienists to be less respectful than female dental hygiene students believed them to be (p=.016). However, no differences were found with regard to the perceived respectfulness as a distinctive characteristic between dentists and dental hygienists (n.s.).

**Discussion**

The current study provides evidence that the stereotypical distinctiveness between dentists and dental hygienists is not as negative as many studies suggest. Still, there are a number of significant differences between the two students groups. The majority of them perceive dominance to be a distinctive characteristic between the two professions, and dentists are believed to be the most dominant. In addition, results of this study also show that dental students identify with all of the investigated occupational stereotypes of dentists. However, they do not identify with the dominance of dental hygienists. In contrast, dental hygiene students most strongly identify with the lower dominance of dental hygienists and, in general, identify with all stereotypical characteristics of both dentists and dental hygienists.

With regard to occupational stereotypes, dental hygiene students do seem to experience many more similarities between dentists, dental hygienists, and their self-image.

The dental and dental hygiene students disagreed about stereotypical distinctiveness between dentists and dental hygienists. Therefore, dental hygiene students might be experiencing a minor social identity threat. The differences with regard to the assertiveness attributed to dental hygienists are not only related to profession but also to gender. The findings of Gorter and Freeman (2005) indicate that the professional communication style of male dentists tends to be more gender-influenced. In this study, dental students and male students are more inclined to regard dental hygienists as being less assertive than dental hygiene and female students perceive them to be. The more positive perceptions of dental hygiene students could be influenced by dental hygiene faculty members since their ingroup identification tends to be stronger than outgroup identification. These dental hygiene faculties might promote a more equal and autonomous role of the dental hygienist compared to their dental colleagues.

Dental and dental hygiene students agree about the dominance of dentists. Even more so, dental students perceive even more distinctiveness between dentists and dental hygienists with regard to dominance than do dental hygiene students. Subsequently, occupational stereotypes with regard to dominance seem to reflect a somewhat dentist-centric collaboration between dentists and dental hygienists. Even though stereotypical perceptions are subjective and a generalization of group characteristics, they are an indication of ingroup consensus (Haslam et al., 2002). Therefore, stereotypical perceptions provides clues about the nature of the interaction between dentists and dental hygienists. Even more so, it confirms the findings and opinions of other authors about the asymmetrical nature of the dentist-dental hygienist work relationship (Adams, 1999; Cotton, 1990; Haldemann, 1988).

The respondents in this study had no prior experience with interprofessional education but were, up to that point, primarily educated in a uniprofessional curriculum. It is possible that faculty members of dentistry express different opinions about the assertiveness of dental hygienists than do those in dental hygiene. Steinert et al. (Steinert, Cruess, Cruess, Boudreau & Fuks, 2007) suggested that it could be necessary to change the hidden curriculum if negative aspects are identified. Faculty development is one of the key approaches for changing it and encompasses attempts to influence the teaching staff to model 'appropriate' behaviors (Goldie, Dowie, Cotton & Morrison, 2007).

In general, both student groups are positive with regard to the respectfulness of both professions which is conditional for intergroup harmony. However, among female students, the profession is related to a difference in perceived respectfulness of dental hygienists. Female dental students are less positive about the respectfulness of dental hygienists possibly due to a perceived competitive tension between female dentists and female dental hygienists.



Furthermore, it is also likely that gender related self-selection at the recruitment phase of the students is a direct result of the professional image that is communicated by the independent dental and dental hygiene institutions and other societal sources of occupational stereotypes.

It is possible that occupational stereotypes are not the only relevant social characteristics that are provisional for interprofessional collaboration. However, their relevance related to interprofessional collaboration is clear and evident. They illustrate conditional features of or a barrier to an equal social interaction between professionals. One-sided dominance shifts the balance to a hierarchical relationship, making interprofessional collaboration less likely to occur.

The self-image of students can represent both a student and a professional identity. The shift between these two social identities is called 'identity mobility' and is influenced by contextual factors (Ginsburg, Regehr & Lingard, 2003; Lingard, Garwood, Szauter & Stern, 2001). In other words, a student has a 'student identity' and a 'professional identity'. Even though students were explicitly requested to report their perceptions as a professional, the respondents completed their questionnaire in an educational setting which may plausibly have triggered their student identity and, therefore, the tendency to behave as such. Furthermore, questionnaires were completed in a controlled environment where students were not able to share ideas or elaborate with each other.

In this study, we did not know exactly which practitioners were possible role models with regard to the social stereotypes as evaluated by both student groups. The influence of the social interaction between faculty members is an element of the 'hidden curriculum', i.e., 'a set of influences that function at the level of organizational structure and culture' (Hafferty, 1998) which also includes core assumptions, routines, and power structures (Mossop, Dennick, Hammond & Robbé, 2013). The occupational stereotypes might be based on professionals such as faculty members but can also be represented by practitioners who are not directly involved in the student training course. However, since these students especially encounter faculty members at this stage, it is likely that faculty members are their most significant source of information.

In this study, only the cognitive component of professional identity was assessed. However, professional identity also comprises occupational commitment, an affective component of professional identity (Tajfel, 1982), which was not included in the study. Therefore, it was not possible to compare the occupational commitment of dental and dental hygiene students. This additional component of professional identity can enhance the predictive value of occupational stereotypes related to interprofessional collaboration.

Interprofessional education can change stereotypical perceptions (Ateah et al., 2011), and adjusting stereotypes is considered to be a key step for enhancing interprofessional collaboration

(Oandasan & Reeves, 2005). Therefore, an earlier introduction of interprofessional education might be important since, in the middle of their professional training, students have already formed occupational stereotypes that indicate a hierarchical and not an interprofessional collaboration between each other's profession.

### **Conclusion**

Only minor differences exist with regard to occupational stereotypes between dental and dental hygiene students. However, purposeful didactic interventions during professional training should adjust the image-formation by dental students with regard to dental hygienists. Furthermore, faculty members should be made aware of the potential impact of their behavior on their own student group and should model 'appropriate' behaviors. Follow up research should focus on the influence of role models as part of the hidden curriculum. In addition, dental and dental hygiene students should be given an equal opportunity to be involved in a shared clinical decision making process.

## References

- Abelsen, B. & Olsen, J.A. (2008). Task division between dentists and dental hygienists in Norway. *Community Dentistry and Oral Epidemiology*, 36 (6), 558-566.
- Adams, K. & Hean, S. (2006). Investigating the factors influencing professional identity of first-year health and social care students. *Learning in Health & Social Care*, 5(2): 55-68.
- Adams, T. (1999). Dentistry and medical dominance. *Social Science & Medicine*, 48, 407-420.
- Adams, T.L. (2004). Attitudes to independent dental hygiene practice: dentists and dental hygienists in Ontario. *Journal Canadian Dental Association*, 70(8), 535-538.
- Alvo, M., Cabilio, P., & Feigin, P.D. (1982). Asymptotic Theory for Measures of Concordance with Special Reference to Average Kendall Tau. *Annals of Statistics*, 10(4), 1033-1311.
- Ashforth, B.E. & Mael, F. (1989). Social Identity theory. *Academy of Management Review*, 14, 20-39.
- Ateah, C.A., Snow, W., Wener, P., MacDonald, L., Metge, C., Davis, P., Fricke, M., Ludwig, S., & Anderson, J. (2011). Stereotyping as a barrier to collaboration: Does interprofessional education make a difference? *Nursing Education Today*, 31, 208-213.
- Ayers, K.M.S., Thomson, W.M., Rich, A.M., & Newton, J.T. (2008). Gender differences in dentists' working practices and job satisfaction. *Journal of Dentistry*, 36, 343-350.
- Bahador, H., Abdolreza Pazooki, A., & Kabir, A. (2010). Effectiveness of Continuing Medical Education considering participant's idea in Iran University. *Journal of the Pakistan Medical Association*, 60(6), 435-439.
- Baker, L., Egan-Lee, E., Martimianakis, M.A., & Reeves, S. (2011). Relationship of power: implications for interprofessional education. *Journal of Interprofessional Care*, 25, 98-104.
- Batalha, L., Akrami, N., & Ekkehammar, B. (2007). Outgroup favoritism: the role of power perception, gender, and conservatism. *Current Research in Social Psychology*, 3(4): 39-49.
- Branscombe, N.R., Ellemers, N., Spears, R., & Doosje, B. (1999). The context and content of social identity threat. In N.R. Ellemers, R. Spears, B. Doosje (Eds.), *Social Identity, Context, Commitment, Content*. (pp. 35-58). Blackwell Publishers, Oxford.
- Branscombe, N.R. & Wann, D.L. (1994). Collective self-esteem consequences of out-group derogation when a valued social identity is on trial. *European Journal of Dental Education*, 24, 641-657.
- Capaciteitsorgaan (2010). Capaciteitsplan 2010. *Voor de medische, tandheelkundige, klinisch technologische en aanverwante (vervolg)opleidingen*. Utrecht: Stichting Capaciteitsorgaan voor Medische en Tandheelkundige Vervolgopleidingen.
- Castledine, G. (1996). Are Nurses being abused by the media? *British Journal of Nursing*, 5, 947.
- Chambers, D.W. (2001). The role of dentists in dentistry. *Journal of Dental Education*, 65(12), 1430-1440.

- Chreim, S., Williams, B.E., & Hinings, C.R. (2007). Interlevel influences on the reconstruction of professional role identity. *Academy of Management Journal*, 50 (6), 1515-1539.
- Cinnirella, M. (1997). Ethnic and National Stereotypes: A Social Identity Perspective. In C.C.Barfoot (Ed.), *Beyond Pug's Tour. National and Ethnic Stereotyping in Theory and Literary Practice*. (pp. 37-51). Amsterdam: Rodopi.
- Cohen, J. (1992). Power primer. *Psychological Bulletin*, 112, 155-159.
- Goldie, J., Dowie, A., Cotton, P., & Morrison, J. (2007). Teaching professionalism in the early years of a medical curriculum: a qualitative study. *Medical Education*, 41(6), 610-117.
- Cotton, F. (1990). Quality control, or just control? *Journal of Dental Hygiene*, 64(7), 320-322.
- Ginsburg, S., Regehr, G., & Lingard, L. (2003). To be and not to be: the paradox of the emerging professional stance. *Medical Education*, 37, 350-357.
- Gorter, R.C. & Freeman, R. (2005). Dentist-assistant communication style: perceived gender differences in The Netherlands and Northern Ireland. *Community Dentistry and Oral Epidemiology*, 33, 131-140.
- Hafferty, F.W. (1998). Beyond curriculum reform: confronting medicine's hidden curriculum. *Academic Medicine*, 73(4), 403-407.
- Haldemann, B. (1988). *Geschichte und Entwicklung des Dental hygieneberufes in der Schweiz mit besonderer Berücksichtigung der Situation in Zürich*. Zürich: Juris Druck Und-Verlag. German
- Hallam, J. (2000). *Nursing the image: Media, culture and professional identity*. London: Routledge.
- Haslam, S.A., Turner, J.C., Oakes, P.J., Reynolds, K.J., & Doosje, B. (2002). From personal pictures in the head to collective tools in the word: how shared stereotypes allow groups to represent and change social reality. In C.McGarty, V.Y.Yzerbyt, & R. Spears (Eds.), *Stereotypes as explanations: The formation of meaningful beliefs about social groups*. (pp. 157-185). Cambridge: Cambridge University Press.
- Hean, S., Clark, J.M., Adams, K., & Humphri, D. (2006). Will opposites attract? Similarities and differences in students' perceptions of the stereotype profiles of other health and social care professional groups. *Journal of Interprofessional Care*, 20 (2), 162-181.
- Hilton, J.L. & Von Hippel, W. (1996). Stereotypes. *Annual Review of Psychology*, 47, 237-271.
- Howell, D.C. (1997). *Statistical methods for psychology*. (2nd ed.) Belmont, CA: Duxbury Press.
- Johnson, P.M. (2009). International profiles of dental hygiene 1987 to 2006: a 21-nation comparative study. *International Dental Journal*, 59, 63-77.
- Jones, L. & Way, D.O. (1997). Is there room for both NPs and MDs. In a community health centre. In C.Patterson (Ed.), *Visions and Voices: the Nurse Practitioner Today*. (pp. 112-128). Toronto, Ontario: Lugus Publications.
- Lewitt, M.S., Ehrenborg, E., Scheja, M., & Brauner, A. (2010). Stereotyping at the undergraduate level revealed during interprofessional learning between future doctors and biomedical scientists. *Journal of Interprofessional Care*, 24 (1), 53-62.

- Lingard, L., Garwood, K., Szauder, K., & Stern, D. (2001). The rhetoric of rationalisation: how students grapple with professional dilemmas. *Academic Medicine*, 76(10), 45-47.
- Luzzi, L. & Spencer, A.J. (2011). Job satisfaction of the oral health labour force in Australia. *Australian Dental Journal*, 56, 23-32.
- Mariano, C. (1989). The case for interdisciplinary collaboration. *Nursing Outlook*, 37, 285-288.
- McGarty, C., Yzerbyt, V.Y., & Spears, R. (2002). Social, cultural and cognitive factors in stereotype formation. In C.McGarty, V.Y.Yzerbyt, & R. Spears (Eds.), *Stereotypes as explanations: The formation of meaningful beliefs about social groups*. (pp. 1-15). Cambridge: Cambridge University Press.
- Morison, S., Marley, J., Stevenson, M., & Milner, S. (2008). Preparing for the dental team: investigating the views of dental and dental care professional students. *European Journal of Dental Education*, 12, 23-28.
- Mossop, L., Dennick, R., Hammond, R., & Robbé, I. (2013). Analysing the hidden curriculum: use of a cultural web. *Medical Education*, 47, 134-143.
- Oandasan, I.O. & Reeves, S. (2005). Key elements for interprofessional education, part 2: factors, processes, outcomes. *Journal of Interprofessional Care*, 19(1), 39-48.
- Ogunbodede, E.O. (2004). Gender Distribution of Dentists in Nigeria, 1981 to 2000. *Journal of Dental Education*, 68(7), 15-18.
- Reinders, J.J. & Blanksma, N.G. (2012). [The collaboration between dentists and dental hygienists: from paradox to resolution]. *Nederlands Tijdschrift Tandheelkunde*, 119, 317-322. *Dutch*
- Ross, M.K., Turner, S., & Ibbetson, R.J. (2009). The impact of teamworking on the knowledge and attitudes of final year dental students. *British Dental Journal*, 206 (3), 163-167.
- Ruble, T.L. & Thomas, K. (1976). Support for a two-dimensional model of conflict behavior. *Organizational Behavior and Human Decision Processes*, 16, 143-155.
- Satin, D.G. (1994). A conceptual model for working relationships among disciplines and the place of interdisciplinary education and practice: clarifying muddy waters. *Gerontology & Geriatrics Education*, 14, 3-24.
- Siegler, E. & Whitney, F.W. (1994). What is Collaboration? In E. Siegler & F.W. Whitney (Eds.), *Nurse - physician collaboration: Care of adults and the elderly*. (pp. 3-10). New York: Springer Publishing Co.
- Snow, W., Wener, P., MacDonald, L., Ateah, C., Davis, P., Fricke, M., Metge, C., Ludwig, S., and Anderson, J. (2011). Student-identified participation barriers to interprofessional education. *Interdisciplinary Studies Journal*, 1(2): 19-27.
- Steinert, Y., Cruess, R.L., Cruess, S.R., Boudreau, J.D., & Fuks, A. (2007). Faculty development as an instrument of change.: a case study on teaching professionalism. *Academic Medicine*, 82 (11), 1057-1064.
- Swanson Jaecks, K.M. (2009). Current Perceptions of the Role of Dental Hygienists in Interdisciplinary Collaboration. *Journal of Dental Hygiene*, 83(2), 84-91.

- Tajfel, H. & Turner, J.C. (1979). An integrative theory of intergroup conflict. In W.G. Austin & S. Worchel (Ed.), *The social psychology of intergroup relations*. (pp. 33-47). Monterey, CA: Brooks/Cole.
- Tajfel, H. (1982). Social psychology of intergroup relations. *Annual Review of Psychology*, 33, 1-39.
- Tajfel, H. & Turner, J.C. (1986). The social identity theory of intergroup behaviour. In S.Worchel, W.G.Austin (Eds.), *Psychology of intergroup relations*. (pp. 7-24). Chicago, IL: Nelson-Hall.
- Thylefors, I., Price, E., Persson, O., & Von Wendt, L. (2000) Teamwork in Swedish neuropaediatric habilitation. *Child: Care, Health and Development*, 26, 515-532.
- Van Knippenberg, A. (1984). *Intergroup differences in group perceptions. The Social Dimension: European Studies in Social Psychology*. Cambridge: Cambridge University Press.
- Wilder, D.A. (1984). Intergroup contact: the typical member and the exception to the rule. *Journal of Experimental Social Psychology*, 20, 177-194.
- Yuan, J.C., Lee, D.J., Kongkiatkamon, S., Ross, S., Prasad, S., Koerber A, Sukotjo C. (2010). Gender Trends in Dental Leadership and Academics: A Twenty-Two-Year Observation. *Journal of Dental Education*, 74 (4): 372-380.
- Zarate, M.A. & Garza, A.A. (2002).. In-group distinctiveness and self affirmation as dual components of prejudice reduction. *Self Identity*, 1(3), 235-249.







# CHAPTER 5

---

## Effect of intergroup comparison of interprofessional interaction on hierarchy in mixed profession groups

Jan Jaap Reinders

Wim P. Krijnen

Aline M. Goldschmidt

Marjolein A.G. van Offenbeek

Boudewijn Stegenga

Cees P. van der Schans

*Submitted*

**Abstract**

Hierarchy may limit interprofessional collaboration; however, group formation could change this. The purpose of this study is to investigate whether intergroup comparison of interprofessional interaction will change the relative dominance of one profession and reduce hierarchy in mixed profession groups. This observational study comprised a randomized double-blind pretest-posttest control group design with 19 mixed profession groups (ten intervention and nine control groups, each with three dental and three dental hygiene students). All of the groups received group-based feedback on interaction during two consecutive two hour team development meetings. The intervention consisted of an intergroup comparison of this feedback. The professional position was the sum of three observation items (conversational turn-taking, dominance, and contributing ideas) scored on a three-point scale: -1=dental dominance, 0=no hierarchy, +1=dental hygiene dominance. Exploratory factor analyses revealed a unidimensional structure with a Cronbach's alpha > .70. Hierarchy was the sum of absolute values of observation items with a minimum value of zero (no hierarchy) and a maximum value of three (strong hierarchy). A two-way factorial ANOVA was performed. Results revealed a significant interaction effect with regard to hierarchy,  $F(1, 17)=6.630$ ,  $p=.020$  and a large effect size (partial eta squared =0.28). Intergroup comparison of interprofessional interaction reduces hierarchy in mixed profession groups.

Keywords - communication; observation; interprofessional collaboration; team development; teamwork; group formation

**Introduction**

Interpersonal competition between members of different professions can be a barrier to effective collaboration (Grant & Finocchio, 1995). For instance, interprofessional competition in response to task shifting can lead to behavior that is more hierarchical, polarize the relationship between those involved in dentistry and dental hygiene (Knevel, Gussy, Farmer & Karimi, 2016), and may lead to underutilization of the dental hygienist (Knevel et al., 2016; Capaciteitsorgaan, 2013). Attitudes of dentists can reflect a relative dominant professional position compared to dental hygienists. The provision of treatment tends to be dentist-centered, and such attitudes are present already at the undergraduate level (Ross, Turner & Ibbetson, 2009; Lewitt, Ehrenborg, Scheja & Brauner, 2010). Dental students may perceive dental hygienists as assistants to a dentist while dental hygiene students may perceive themselves as independent professionals (Morison, Marley, Stevenson & Milner, 2008).

Hierarchical interaction may limit the collaboration between members of different professions (Edmondson, 2003). Non-hierarchical groups are more productive in the sense that individuals

have a higher identification with their enterprise, feel more committed, and consequently do a better job (Godard & Delaney, 2000; Huselid, 1995; Ichniowski, Shaw & Prennushi, 1997; Wenga & Carlsson, 2015). Hierarchy is a rank order of individuals or groups on a valued social dimension (Magee & Galinsky, 2008, p. 354) and is common to all social groups including professions (Brown, 1991). It is represented by the relative dominance between individuals (Cheng, Tracy, Foulsham, Kingstone & Henrich, 2013; Cheng, Tracy & Henrich, 2010) and evident in several observable behaviors. Hierarchical interaction is visible in asymmetry during conversational turn-taking (Bateson, 1972; Corser, 1998; West, 1979), i.e., dominant individuals tend to talk more often than those that are less dominant. Non-hierarchical interaction is interprofessional since it is inherent to the concept of interprofessional collaboration (D'Amour, Ferrada-Videla, San Martin Rodriguez & Beaulieu, 2005; Headrick, Wilcock & Batalden, 1998). It concerns a behavioral pattern characterized by similar behavior of interacting individuals (Bateson, 1972). According to interaction theory (Gallagher 2008; Gallagher, 2005), our understanding of others is based on our interactions and perceptions. It is also inherent in socialization (Clausen, 1968). The claim-affirmation model of Holmes (2001) describes the process of professional socialization in which individuals claim or disclaim their professional attributes and affirm or disaffirm other people's professional attributes. This process reflects the relationship between members of different professions and is visible in hierarchy between members of different professions. Non-hierarchical interaction between group members becomes apparent in the willingness to share (Guzzo, 1995; Yukelson, Weinberg & Jackson, 1984) and is especially functional when group tasks require a broad range of ideas and perspectives (Anderson & Brown, 2010).

When interprofessional collaboration must be enhanced, the undesired effects of social psychological intergroup processes between members of different professions must be reduced, and the hierarchy between those different professionals needs to be changed. The psychological formation of mixed profession groups during professionals' education is a promising strategy to influence perceived interprofessional relationships early on (Reinders, Krijnen, Stegenga & Van der Schans, 2017). However, it is not known to what degree psychological mixed profession group formation can reduce hierarchy between students of different disciplines.

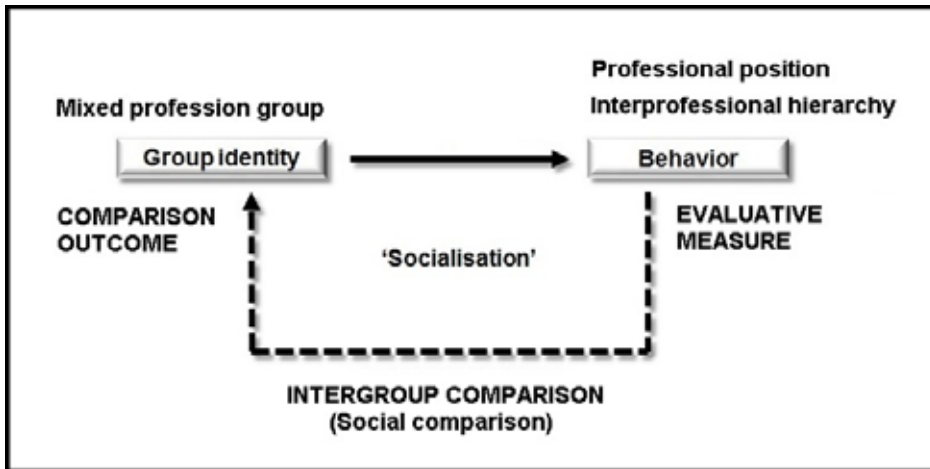
Intergroup comparison can enhance intragroup collaboration (Böhm & Rockenbach, 2013) because it enhances social identification. This identification is associated with perceived intragroup similarity through psychological distinctiveness from another group (Tajfel & Turner, 1979). Such intragroup similarity is associated with greater group cohesion. Commitment increases within a group and is a direct determinant of behaviors that benefit in-group members (Bergami & Bagozzi, 2000). Group cohesion is also positively related to performance (Beal, Cohen, Burke & McLendon, 2003; Gully, Devine & Whitney, 1995). Besides the influence of intergroup comparison on group formation, the introduction of out-groups

can also divert interpersonal competition from within a group towards competition between groups (Munkes & Diehl, 2003). Therefore, interprofessional collaboration between dental and dental hygiene students could be enhanced when they are part of a mixed profession group and social comparison with another mixed profession group is facilitated. When individuals perceive a mixed profession group as their in-group, they are more likely to exhibit strong bonds with tendencies towards inward social loyalty and conformity across the membership (Braithwaite et al., 2016). Thus, intergroup comparison between mixed profession groups is likely to facilitate interprofessional identification. If so, than interprofessional hierarchy should be diminished when group members identify with their mixed profession group.

The type of evaluative measure (Fig. 1) for social comparison determines how group members distinguish themselves from other groups (Ashfort & Kreiner, 1999). This differentiation is reflected in the group identity as a comparison outcome (Tajfel & Turner, 1979). In turn, group identity will guide corresponding behavior (Van Knippenberg & Rast III, 2012; Kelly, 1993; Kreiner, 1999). Therefore, when interprofessional interaction is explicitly used as an evaluative measure subject to intergroup comparison, a group identity based on interprofessional interaction is likely to become the comparison outcome that will, ultimately, result in displaying non-hierarchical interaction between members of different professions.

**Figure 1.**

How intergroup comparison of interprofessional interaction is presumed to be related to professional position and interprofessional hierarchy



The purpose of this study is to investigate whether intergroup comparison of interprofessional interaction will change the relative dominance of one profession (professional position) and reduce interprofessional hierarchy in mixed profession groups.

## Methods

We conducted a randomized double-blind pretest-posttest control group design with mixed profession groups. Each group consisted of six students (three dental and three dental hygiene students) who performed assignments related to team development and interprofessional care.

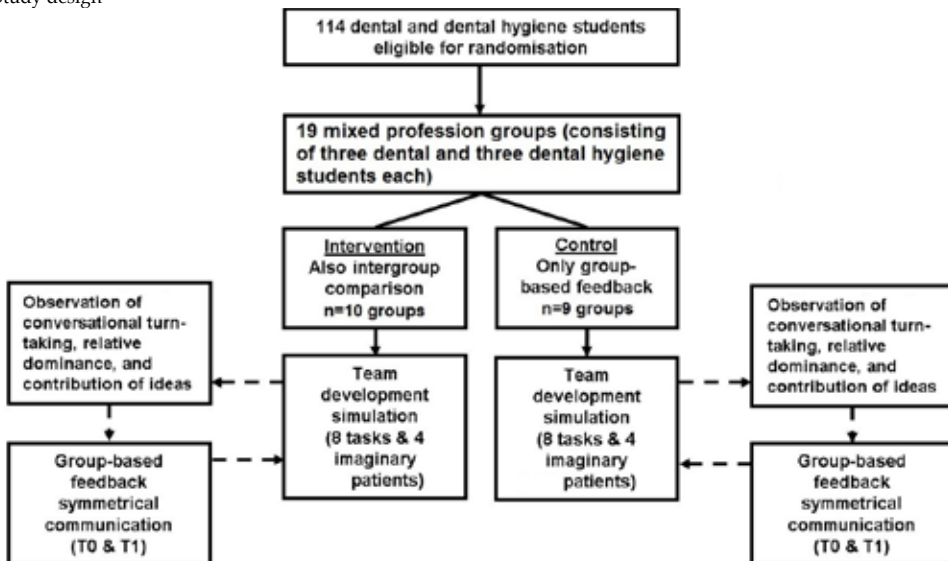
### Participants

Eligible participants were dental students of the University of Groningen and dental hygiene students of the Hanze University of Applied Sciences who were at the midpoint of their undergraduate training. None of the students had previous experience with interprofessional collaboration; they had only received single-discipline education.

### Study design

We randomly (alphabetically) assigned 114 dental and dental hygiene students to 19 mixed profession groups, each simulating an oral care practice. Subsequently, the groups were randomly assigned to either an intervention condition or a control condition (Fig. 2). Each mixed profession group received eight team development assignments (e.g., mission statement, business establishment, interior design, practice website, work schedules, protocols) and four virtual patient assignments for shared care planning. The assignment results were placed in a group portfolio after each group meeting. The experiment lasted four hours divided over two consecutive group meetings of two hours each.

Figure 2.  
Study design



Psychologists and psychology master students were trained as observers to score specific communicative behaviors between dental and dental hygiene students (ratio of conversational turn-taking, relative dominance, and relative contribution of ideas) during two consecutive group meetings for fifteen minutes at a time. Each mixed profession group consisted of two subgroups: one subgroup of three dental and one of three dental hygiene students. Interprofessional communication between the subgroups in each mixed profession group was observed for the purpose of measurement and group-based feedback as well as experimental intervention (intergroup comparison). Observed hierarchy between dental and dental hygiene students was recoded and reframed as 'interprofessional interaction' before it was communicated as group-based feedback to each group. Only the intervention mixed profession groups received the observation results of other mixed profession groups. This additional information for intergroup comparison was distributed through the portfolio of each mixed profession group in the intervention condition before the beginning of their second group meeting.

#### *Ethical considerations*

We informed all of the participants about the study, and they could withdraw at any given time. We guaranteed full anonymity of all participants. The Institutional Review Board of the Hanze University of Applied Sciences approved this study.

#### *Measurement of professional position and interprofessional hierarchy*

Professional position was defined as the relative dominance of members of one profession over members of another profession (based on Lindemann, 2007). This was measured with three observation items (i.e., conversational turn-taking, relative dominance, and relative contributing ideas). Interprofessional hierarchy was the degree of hierarchy within a mixed profession group without considering the dominant position of one profession over the other.

*Observation item 1.* Ratio of conversational turn-taking. The ratio of conversational turn-taking was measured by the observers on a group-level between the subgroups of dental and dental hygiene students for fifteen minutes at a time. Each initiated verbal response by one of these students was counted during each collective group meeting (West, 1979). A non-participating observer (psychologist or psychology master student) began each observation by identifying participants (dental or dental hygiene students) within a mixed profession group. In order to clearly register the responses of these students during the group meeting, the profession and physical position of each student was determined beforehand. Each initiated verbal response of at least three words was counted as a turn. The ratio was calculated by dividing the average turns of dental hygiene students by those of dental students. The value '0' (= no hierarchy) was assigned when the ratio of conversational turn-taking was between 45% and 55%. The professional position was based on dental domination (-1=dental dominance) when the ratio of conversational turn-taking was more than 55% and dental hygiene domination (+1=dental

dominance) when it was less than 45% of the time during a team meeting. These turn-taking intervals corresponded with the group-based feedback standard on this communicative behavior during the simulation. This observation item had a three-point scale: -1=dental dominance, 0=no hierarchy, +1=dental hygiene dominance.

*Observation item 2. Relative dominance.* Relative dominance was measured by observers on a group-level between the subgroups of dental and dental hygiene students for fifteen minutes at a time. During the observer training, several indicators of dominance were discussed: interruption, questioning, topic control, formulation, and amount of talk (e.g., Roger & Schumacher, 1983; Kollock, Blumstein, & Schwartz, 1985; Adelswärd et al., 1987; Ten Have, 1991; Duff, 1986; Linell, 1990). Observers evaluated this relative dominance between dental and dental hygiene students within a mixed profession group using an impression scale: -1=dental dominance, 0=no hierarchy, +1=dental hygiene dominance.

*Observation item 3. Relative contribution of ideas.* The relative contribution of ideas was measured by observers on a group-level between the subgroups of dental and dental hygiene students for fifteen minutes at a time. The relative contribution of ideas is also considered an indication of dominance in the groups (James, 2006). It was defined as the verbal response of a person bringing about a result by providing a meaningful thought, conception, or notion (Stichler, 1995). Verbal responses, which were an expression of agreement, understanding, or listening, were not considered as a contribution of an idea. Observers evaluated this relative contribution of ideas between dental and dental hygiene students within a mixed profession group using an impression scale: -1=dental dominance, 0=no hierarchy, +1=dental hygiene dominance.

#### *Psychometric properties*

Professional position and interprofessional hierarchy were each applied as an index based on psychometric properties when factorability was sufficient. An exploratory factor analysis was applied to determine whether all three observation items represent the same latent variable. A principal components analysis was used because the primary purpose was to identify and compute composite scores for the underlying factor. In order to analyze the precision of estimates, the amount of variance explained is interpreted (Duncan, 1975). The factorability of the three observation items was based on several criteria: item commonalities, factor loadings, and internal consistency (Cronbach's alpha).

Item commonalities are considered sufficient when they are higher than .40 (Velicer & Fava, 1998). The least number of factors should be used to explain approximately 50 to 75% of the variance (Tabachnick & Fidell, 2001). Factor loadings are sufficient when they are at least as high as .32 (Tabachnick & Fidell, 2001). Strong loadings are .50 or greater. The internal consistency is considered sufficient when it is higher than .70 (Nunnally, 1978; Nunnally & Bernstein, 1994).

Professional position represented the relative dominant position of one profession over the other. Therefore, it was calculated as the sum of the three observation item scores. Professional position has a minimum value of -3 and a maximum value of +3 since each observation item had a minimum value of -1 and a maximum value of +1.

Interprofessional hierarchy represented the degree of hierarchy within a mixed profession group independent of the professional position of either party. Therefore, it was calculated as the sum of absolute values of observation items since each observation item had a minimum value of -1 and a maximum value of +1. Thus, interprofessional hierarchy has a minimum value of 0 (no hierarchy) and a maximum value of 3 (strong hierarchy).

#### *Data analyses*

A two-way factorial ANOVA was applied to analyze main effects (time or experimental condition) and interaction effects between time and experimental condition. This analysis was performed to separately investigate both professional position and interprofessional hierarchy. To determine the effect size, the partial eta squared was used. A partial eta squared of 0.01 is considered as being small, 0.06 as medium, and 0.14 as large (Cohen, 1988; Field, 2005). Before performing each two-way factorial ANOVA analysis, potential pretest differences of both professional position and interprofessional hierarchy were tested by an ANOVA. For all of the analyses, we applied a significance level of .05.

## **Results**

#### *Descriptive statistics*

The group of students eligible for randomization consisted of 114 dental and dental hygiene students. The gender distribution did not differ between experimental condition (Table 1). The majority of both dental and dental hygiene students consisted of female students (63.3%, n=31; 95.7%, n=44). Dental students were older than dental hygiene students in both intervention and control conditions (mean=22.7 years, SD=1.8 years versus mean=21.1 years, SD=1.8 years; p<.001).



**Table 1.**

Descriptive statistics of intervention and control condition (n=96)

Demographic variables	Experimental condition		P-value Chi square test
	Intervention (n=52)	Control (n=44)	
Gender			
- Male	25% (n=13)	16.3% (n=7)	.299
- Female	75% (n=39)	83.7% (n=36)	
			Independent t-test
Years of age	22.2 (SD=2.0)	21.5 (SD=1.7)	.082

*Psychometric properties*

All values of the criteria used to determine the psychometric properties of our measurement were sufficient or more than sufficient (Table 2). Commonalities of the pretest items were .664, .771, and .521. Of the posttest items, this was .750, .647, and .562. Therefore, the commonalities of both measurement moments were sufficient (Velicer & Fava, 1998). We found one factor for both the pretest and the posttest which explained more than 65.2% and 65.3% of the variance. This percentage of explained variance is more than adequate in social scientific research (Tabachnick & Fidell, 2001). Our factor loadings varied between .722 and .878 which are high values (Tabachnick & Fidell, 2001). The internal consistency of our measurement 'professional position' has a Cronbach's alpha's of .73 at the pretest and .71 at the posttest.

**Table 2.**

Observation items of 'professional position' and summary statistics

Measurement	Observation item	Factor Loading (EFA)	Cronbach's alpha	% variance explained
T0	Conversational turn-taking	.815	.73	65.2%
	Impression of dominance	.878		
	Contribution of ideas	.722		
T1	Conversational turn-taking	.866	.71	65.3%
	Impression of dominance	.804		
	Contribution of ideas	.750		

*The effect on professional position*

An analysis of pretest differences on professional position revealed no significant differences between experimental conditions ( $F(1,17)=.000$ ,  $p=.988$ ). Therefore, a two-way factorial ANOVA analysis could be performed without having to use baseline scores as a covariate. Table 3 depicts the means, standard errors, and lower and upper bounds (95% confidence interval) at T0 and T1 measurement moments of the intervention and control condition. The mixed profession groups in the intervention and control conditions display a similar professional position.

**Table 3.**

Means and standard errors of professional position between dental and dental hygiene students in mixed profession groups during the experiment (n=19 groups)

Experimental condition									Two-way factorial ANOVA P-value	
Intervention				Control						
	Std.		Lower	Upper	Std.		Lower	Upper		
Time	Mean	Error	Bound	Bound	Mean	Error	Bound	Bound	Time	
T0	-0.90	0.52	-2.00	0.20	-0.89	0.55	-2.04	0.27	Cond.	.415
T1	0.10	0.47	-0.88	1.08	-1.00	0.49	-2.04	0.04	Time*Cond.	.081

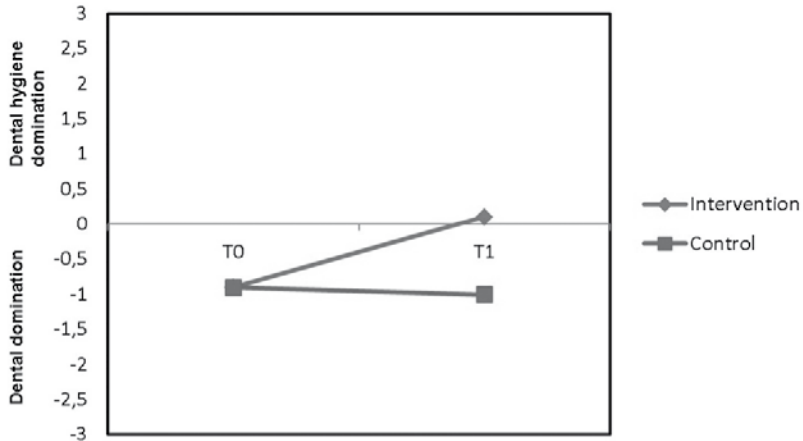
Time=Professional position at T0 and T1; Cond.=Experimental condition (intervention versus control); Time\*Cond.=interaction between Time and Experimental condition. 95% Confidence Interval

Figure 3 shows that a trend towards a changed professional position of dental students was visible but not significant. Table 3 indicates that there is no interaction effect between experimental condition and time,  $F(1, 17) = 3.441$ ,  $p=.081$ . The partial eta squared of this non-significant interaction effect was large since it was 0.17 (Cohen, 1988; Field, 2005).

The experimental condition (intervention versus control) as a between-subjects factor did not reveal a main effect  $F(1,17) = 0.700$ ,  $p= .415$ . No main effect was found on time (professional position before and after the experiment),  $F(1,17) = 2.202$ ,  $p=.156$ .

**Figure 3.**

Professional position of dental and dental hygiene students in mixed profession groups before and after the experiment



#### *The effect on interprofessional hierarchy*

An analysis of pretest differences on interprofessional hierarchy revealed no significant differences between experimental conditions ( $F(1,17)=.015$ ,  $p=.904$ ). Therefore, a two-way factorial ANOVA analysis could be performed without having to use baseline scores as a covariate.

Table 4 shows the means, standard errors, and lower and upper bounds (95% confidence interval) at T0 and T1 measurement moments of the intervention and control condition. The mixed profession groups in the intervention and control conditions seem to display a similar magnitude of interprofessional hierarchy in both conditions ( $M=1.50$ ,  $SE=0.31$  and  $M=1.56$ ,  $SE=0.33$  respectively).

**Table 4.**

Means and standard errors of interprofessional hierarchy between dental and dental hygiene students in mixed profession groups during the experiment (n=19 groups)

Experimental condition									Two-way factorial ANOVA P-value	
Intervention			Control						Time	
Std.	Lower	Upper	Std.	Lower	Upper	Std.	Lower	Upper		
Time	Mean	Error	Bound	Bound	Mean	Error	Bound	Bound	Time	.304
T0	1.50	0.31	0.84	2.16	1.56	0.33	0.86	2.25	Cond.	.110
T1	0.70	0.28	0.12	1.28	1.89	0.29	1.27	2.50	Time*Cond.	.020

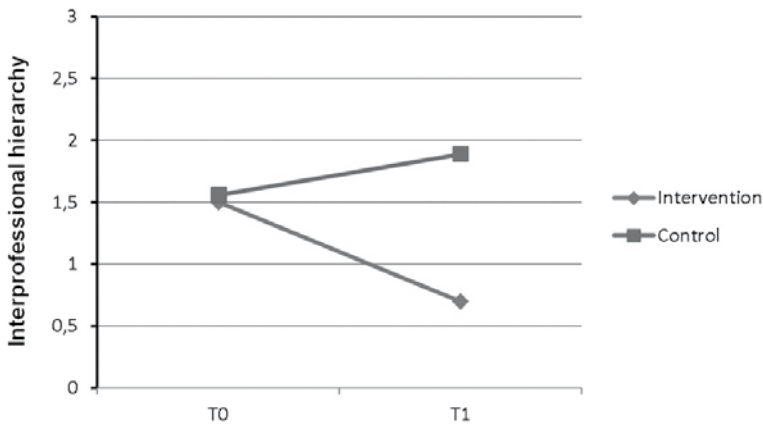
Time=Interprofessional hierarchy at T0 and T1; Cond.=Experimental condition (intervention versus control); Time\*Cond.=interaction between Time and Experimental condition. 95% Confidence Interval

Figure 4 illustrates a downward trend of interprofessional hierarchy in the intervention condition and an upward trend of interprofessional hierarchy in the control condition. Table 4 shows that an interaction effect was determined between experimental condition and time,  $F(1, 17) = 6.630, p=.020$ . The partial eta squared of the interaction effect was large since it was 0.28 (Cohen, 1988; Field, 2005).

The experimental condition (intervention versus control) as a between-subjects factor did not reveal a main effect  $F(1,17) = 2.846, p= .110$ , see Table 4 and Figure 3. No main effect was found on time (interprofessional hierarchy before and after the experiment),  $F(1,17) = 1.124, p=.304$ .

**Figure 4.**

Interprofessional hierarchy of dental and dental hygiene students in mixed profession groups before and after the experiment



## Discussion

Intergroup comparison of interprofessional interaction reduces interprofessional hierarchy in mixed profession groups. However, in this study, no conclusive evidence was determined for a change in professional position. Thus, dental and dental students tend to communicate more equally after an intervention based on group identification through intergroup comparison of interprofessional interaction. Therefore, an approach such as psychological mixed profession group formation appears to be a suitable solution for the problem of hierarchy between members of different professions.

Although the professional position of dental students did not significantly change, a trend was observed with regard to the professional position of dental students. The p-value is often perceived as a statement about the relationship between the data and hypothetical explanation (Wasserstein & Lazar, 2016). However, the p-value does not provide an explanation or evidence that the professional position of dental students did not change. Since the number of participating groups in this experiment was relatively small, it became more difficult to find a statistical significant result (Ellis, 2010). A sample size can be too small to distinguish the effect from random chance. Also, large effects may produce unimpressive p-values if the sample size is small (Wasserstein & Lazar, 2016). P-values are inversely related to sample size whereas measures of effect size are not systematically related to sample size.

Besides statistical significance, effects sizes should be reported for inferential tests and are essential to good research (Wilkinson & APA Task Force on Statistical Inference, 1999). Even though results might be insignificant, there can still be notable effects in low powered tests. The effect size of the significant interaction effect on interprofessional hierarchy was large; however, the effect size of the non-significant interaction effect on professional position was also large.

Researchers should base their inferences on several factors such as quality of measurements, study design, and the external evidence for studied phenomenon. We used a reliable measurement to analyze the effect of the experimental intervention. Furthermore, we developed a strong study design which is seldom used when investigating the effectiveness of interprofessional education (Reeves et al., 2016). Our design has at least five strong design features. In our study, we expected that the professional position of dental students would change when we facilitated mixed profession group identification. This expectation was based on several studies with many different human subjects. There is no reason to suspect that dental and dental hygiene students would not display similar social behaviors just like any other human beings. The only difference is that we applied this external evidence to produce a specific effect between members of different professions. We wanted to change professional position and reduce the hierarchy between members of different professions in general.

The decreased interprofessional hierarchy corresponds with the theory that intergroup comparison affects psychological mixed profession group formation. Intergroup comparison is an intergroup process that results in intergroup differentiation in a certain evaluative dimension (Ashfort & Kreiner, 1999). The social identity theory (Tajfel & Turner, 1979) suggests that similar groups should have increased motivation to distinguish themselves from the other. Perceived ingroup similarity, inherent to social identification, increases because of outgroup distinctiveness. When applied to mixed profession groups, the perceived similarity between dental and dental hygiene students in a mixed profession group is likely to increase. If so, then mixed profession group identification might influence the formation of an interprofessional identity. Several authors suggest that this formation will enhance interprofessional collaboration (e.g., Baker, Egan-Lee, Martimianakis & Reeves, 2011; Carpenter & Dickinson, 2008; Hammick, Freeth, Copperman & Goodson, 2009; Khalili, Orchard, Spence Laschinger & Farah, 2013). However, even though interprofessional identity formation might have been facilitated during our intervention, only the influence of intergroup comparison between mixed profession groups was measured in our study. It is an indirect indication that interprofessional identification occurred.

In our study, all groups were equal in composition and had a similar objective. Therefore, it is likely to assume that their motivation to differentiate between groups was increased when feedback enabled intergroup comparison. Intergroup differentiation is associated with identity formation of which the identity content depends on the content of the evaluative dimension (Ashfort & Kreiner, 1999; Hogg, van Knippenberg & Rast III, 2012; Kelly, 1993). In order to guide the nature of their intergroup differentiation, we controlled the nature of the comparison outcome. The intervention groups compared themselves with other mixed profession groups using interprofessional interaction (non-hierarchical interaction between members of different professions; D'Amour et al., 2005) as an evaluative measure. Even though interprofessional identification was not measured, the results of the current experiment do correspond with this presumed social psychological mechanism. For this, another indication was found in an experiment regarding a mixed profession group formation intervention and perceived interprofessional task distribution (Reinders et al., 2017). In that study, the combination of group-based feedback, intergroup comparison, and intergroup competition between mixed profession groups was facilitated. Following that intervention, half of all of the predefined professional tasks became more shared (less dentist-centric) between dental and dental hygiene students. The perceptions of dental students especially became less dentist-centric. The tendency to share with members of one's own group becomes more likely when people are committed to their group (Guzzo, 1995; Yukelson et al., 1984). Group commitment is associated with psychological group formation (Beal et al., 2003). However, psychological mixed profession group formation does not necessarily have to imply that an interprofessional identity is developed during the group development process. It might just have facilitated a temporary mixed profession group identity and not have influenced the

professional identity formation of the participants. However, a longitudinal psychological mixed profession group formation might consolidate the group identity as an interprofessional identity as an integrated part of the professional identity. When comparing this to behavioral change in general, routines are more sustainable when they are consistently displayed over a longer period. For instance, researchers have found proof that, when changed behavior is consistent for at least six months, it becomes more likely that it will become a sustainable change (Prochaska, DiClemente & Norcross, 1992). This sustainable change of professional identity is referred to as 'internalization' (Yu & Wright, 2015). Further research must clarify whether this approach is sustainable and if it affects professional identity formation.

An alternative explanation of the findings of this study and a former study (Reinders et al., 2017) is the contact hypothesis (or Intergroup Contact Theory) of Allport (1954). The premise of his theory states that interpersonal contact can reduce prejudice between groups. By facilitating communication between members of different groups, mutual understanding of different viewpoints can be enhanced just like the students in a mixed profession group. However, the contact between students in the control condition did not reduce interprofessional hierarchy. Non-hierarchical interaction concerns a behavior pattern formed from similar behavior of interacting individuals (Bateson, 1972). Social similarity is inherent to the perception of the ingroup as one entity (Campbell, 1958) and inherent to a shared social identity (Gaertner, Rust, Dovidio, Bachman & Anastasio, 1994). Therefore, it is more likely that a shared social identity was developed in the intervention groups and that this shared identity concerns interprofessionality because of the nature of the comparison outcome. Further research must substantiate that interprofessional identification can be enhanced by psychological mixed profession group formation with intergroup comparison based on interprofessional behavior.

Dental students were older in both of the experimental conditions. Age-related status in peer collaboration may play a role in how partners interact (Glachen & Light, 1982). Therefore, the interprofessional hierarchy at the beginning of the experiment might have been caused by these age differences. In small children, such age differences have a great impact because of differences in age-related mental development (Feldman & Ruble, 1988). These types of age-related developmental differences do not apply to adults or, to a lesser degree, adolescents. Therefore, it is unlikely that a mean age-difference of 1.6 years has a significant impact.

A limitation of our study is that it was conducted in an educational setting as part of the IPE program. In such a context, it is more difficult to exert control over experimental conditions since students might have influenced each other between their mixed profession group meetings. However, the strengths of this study are its group randomization and double-blind design. In this way, the cause and effect relationship in this study can be interpreted with more confidence compared to other designs. First, because of the double-blind design, both the subjects and the observers did not know which group was selected for which

experimental condition. Second, the size of each group was the same. Third, dental and dental hygiene students were equally represented in each mixed profession group. Fourth, students were randomly assigned to a mixed profession group. Fifth, all experimental procedures, assignments, tasks, and assessments were standardized with protocols. Besides the quality of our measurements and our study design, the intervention was derived from our applied theory which was based on comprehensive external evidence.

The results of this study might be reproducible in daily health care practice. In order to do this, the interaction between professionals must be measured in at least two health care teams. Then, these team practices must be able to compare their own interaction with the interprofessional interaction in other practices. However, many other influences that affect treatment and collective behavior are less easy to control. The influence of legal issues and liabilities (Colvin et al., 2016) or incentives in remuneration systems (Brocklehurst et al., 2016) are examples of factors that are likely to influence collaboration between dentists and dental hygienists.

### **Conclusions and Future Study**

Conscious intergroup comparison of interprofessional interaction reduces interprofessional hierarchy between students of different disciplines in mixed profession groups. This psychological approach to enhancing interprofessional behavior appears to be a beneficial educational strategy. Whether it would produce similar results among graduated health care professionals is unknown. However, regardless of the study's limitations, the outcomes correspond with the proposed theoretical framework for enhancing mixed profession group formation by intergroup comparison. Future studies may examine whether this approach produces sustainable effects. A related and relevant research topic is how this approach affects professional identity formation.

### **Disclosure statement**

No potential conflict of interest was reported by the authors.



## References

- Adelswärd, V., Aronsson, K., Jönsson, L., & Linell, P. (1987). The unequal distribution of interactional space: Dominance and control in courtroom interaction. *Text*, 7(4), 313-346.
- Allport, G.W. (1954). *The nature of prejudice*. Cambridge, MA: Perseus Books.
- Anderson, C., & Brown, C.E. (2010). The functions and dysfunctions of hierarchy. *Research in Organizational Behavior*, 30, 55-89.
- Ashfort, B.E., Kreiner, G.E. (1999). "How can you do it?": Dirty work and the challenge of constructing a positive identity. *Academy of Management Review*, 24, 413-434.
- Baker, L., Egan-Lee, E., Martimianakis, M. A., & Reeves, S. (2011). Relationships of power: implications for interprofessional education. *Journal of Interprofessional Care*, 25, 98-104.
- Bateson, G. (1972). *Steps to an Ecology of Mind*. San Francisco: Chandler.
- Beal, D. J., Cohen, R., Burke, M. J. & McLendon, C. L. (2003). Cohesion and performance in groups: A meta-analytic clarification of construct relation. *Journal of Applied Psychology*, 88, 989-1004.
- Bergami, M., & Bagozzi, R.P. (2000). Self-categorization, affective commitment and group self-esteem as distinct aspects of social identity in the organization. *British Journal of Social Psychology*, 39(4), 555-577.
- Böhm, R., & Rockenbach, B. (2013). The inter-group comparison-intra-group cooperation hypothesis: comparisons between groups increase efficiency in public goods provision. *PLoS One*, 8(2), e56152.
- Braithwaite, J., Clay-Williams, R., Vecellio, E., Marks D, Hooper T, Westbrook J., et al. (2016). The basis of clinical tribalism, hierarchy and stereotyping: a laboratory-controlled teamwork experiment. *BMJ Open*, 6, e012467.
- Brocklehurst, P, Birch, S, McDonald, R., Hill, H., O'Malley, L., Macey, R., et al. (2016). Determining the optimal model for role substitution in NHS dental services in the UK: a mixed-methods study. *Health Services and Delivery Research*, 4(22).
- Campbell, D.T. (1958). Common fate, similarity, and other indices of the status of aggregates of person as social entities. *Behavioural Science*, 3, 14-25.
- Capaciteitsorgaan. (2013). *Capaciteitsplan 2013. Voor de medische, tandheelkundige, klinisch technologische en aanverwante (vervolg)opleidingen*. Utrecht: Stichting Capaciteitsorgaan voor Medische en Tandheelkundige Vervolgopleidingen. *Dutch*
- Carpenter, J., & Dickinson, H. (2008). *Interprofessional education and training*. United Kingdom, Bristol: The Policy Press.
- Cheng, J. T., Tracy, J. L., Foulsham, T., Kingstone, A., & Henrich, J. (2013). Two ways to the top: Evidence that dominance and prestige are distinct yet viable avenues to social rank and influence. *Journal of Personality and Social Psychology*, 104, 103-125.
- Cheng, J. T., Tracy, J. L., & Henrich, J. A. (2010). Pride, personality, and the evolutionary foundations of human social status. *Evolution and Human Behavior*, 31, 334-347.

Clausen, J.A. (1968). *Socialization and Society*. Boston: Little Brown and Company.

Colvin, C.J., de Heer, J., Winterton, L., Mellenkamp, M., Glenton, C., Noyes, J., Lewin, S., & Rashidian A. (2013). A systematic review of qualitative evidence on barriers and facilitators to the implementation of task-shifting in midwifery services. *Midwifery*, 29(10), 1211-1221.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Earlbaum Associates.

Corser, W. D. (1998). A conceptual model of collaborative nurse-physician interactions: The management of traditional influences and personal tendencies. *Scholarly Inquiry for Nursing Practice*, 12, 325–341.

D'Amour, D., Ferrada-Videla, M., San Martin Rodriguez, L., & Beaulieu, M.D. (2005). The conceptual basis for interprofessional collaboration: core concepts and theoretical frameworks. *Journal of Interprofessional Care*, 19(1), 116-31.

Duff, P.A. (1986). Another look at interlanguage talk: Taking task to task. In R.R. Day (Ed.), *Talking to learn: Conversation in second language acquisition* (pp. 147-181). Cambridge, MA: Newbury House.

Duncan, O. D. (1975). *Introduction to Structural Equation Models*. Academic Press, New York. Edmondson, A.C. (2003). Framing for learning: Lessons in successful technology implementation. *California Management Review*, 45(2), 3454.

Ellis, P.(2010). *The Essential Guide to Effect Sizes: Statistical Power, Meta-Analysis, and the Interpretation of Research Results*. Cambridge University Press.

Feldman, A.S. & Ruble, D.N. (1988). The effect of personal relevance on dispositional inference: A developmental analysis. *Child Development*, 59, 1339-1352.

Field, A. (2005). *Discovering statistics using SPSS* (2nd ed.). London: Sage.

Gallagher, S. (2008). Direct perception in the intersubjective context. *Consciousness and Cognition*, 17(2), 535–543.

Gallagher, S. (2005). *How the Body Shapes the Mind*. Oxford: Oxford University Press/Clarendon Press.

Gaertner, S. L., Rust, M., Dovidio, J. F., Bachman, B. A., & Anastasio, P. A. (1994). The contact hypothesis: The role of common ingroup identity on reducing intergroup bias. *Small Group Research*, 25, 224-249.

Glachen, M., & Light, P. (1982). Peer interaction and learning: Can two wrongs make a right? In G. Butterworth, P. Light (Eds.), *Social cognition: Studies of the development of understanding* (pp. 238-262). Brighton: Harvester.

Godard, J., & Delaney, J., (2000). Reflections on the “High Performance” paradigm’s implications for industrial relations as a field. *Industrial and Labor Relations Review*, 53, 482–502.

Grant, R.W., & Finnocchio L.J. (1995). *California Primary Care Consortium Subcommittee on Interdisciplinary Collaboration. Interdisciplinary Collaborative Teams in Primary Care: A Model Curriculum and Resource Guide*. San Francisco, CA: Pew Health Professions Commission.

Gully, S.M., Devine, D.J., & Whitney, D.J. (1995). A meta-analysis of cohesion and performance: Effects of level of analysis and task interdependence. *Small Group Research*, 26, 497-520.

- Guzzo, R.A. (1995). At the intersection of team effectiveness and decision making. In R.A.Guzzo, & E. Salas (Eds.), *Team Effectiveness and Decision Making in Organizations* (pp. 1-8). San Francisco: Jossey-Bass.
- Hammick, M., Freeth, D., Copperman, J., & Goodsman, D. (2009). *Being interprofessional*. Cambridge: Polity Press.
- Headrick, L.A., Wilcock, M., & Batalden B. (1998). Interprofessional working and continuing medical education. *British Medical Journal*, 316, 771-4.
- Hogg, M.A., van Knippenberg, D., & Rast III, D.E. (2012). The social identity theory of leadership: Theoretical origins, research findings, and conceptual developments. *European Review of Social Psychology*, 23(1), 258-304.
- Holmes, L. (2001). Reconsidering Graduate Employability: the 'graduate identity' approach. *Quality in Higher Education*, 7(2), 111-119.
- Huselid, M.A. (1995). The impact of human resource management practices on turnover, productivity, and corporate financial performance. *Academy of Management Journal*, 38, 635-672.
- Ichniowski, C., Shaw, K., & Prennushi, G. (1997). The effects of human resource management practices on productivity: a study of steel finishing lines. *American Economic Review*, 87, 293-313.
- James, M.C. (2006). The effect of grading incentive on student discourse in peer instruction. *American Journal of Physics*, 8:689-691.
- Kelly, C. (1993). Group Identification, Intergroup Perceptions and Collective Action. *European Review of Social Psychology*, 4(1), 59-83.
- Khalili, H., Orchard, C., Spence Laschinger, H.K., & Farah, R. (2013). interprofessional socialization framework for developing an interprofessional identity among health professions students. *Journal of Interprofessional Care*, 27(6), 448-453.
- Knevel, .R, Gussy, M.G., Farmer, J., & Karimi, L. (2016). Nepalese dental hygiene and dentistry students towards the dental hygienists profession. *International Journal of Dental Hygiene* [Epub ahead of print]
- Kollock, P., Blumstein, P., & Schwartz, P. (1985). Sex and power in interaction: Conversational privileges and duties. *American Sociological Review*, 50, 34-46.
- Lewitt, M.S., Ehrenborg, E., Scheja, M., & Brauner, A. (2010). Stereotyping at the undergraduate level revealed during interprofessional learning between future doctors and biomedical scientists. *Journal of Interprofessional Care*, 24(1), 53-62.
- Lindemann, K. (2007). The Impact of Objective Characteristics on Subjective Social Position. *Frames*, 11: 54-68.
- Linell, P. (1990). The power of dialogue dynamics. In I. Marková and K. Foppa (Eds.), *The dynamics of dialogue* (pp. 147-177). Hemel Hempstead: Harvester Wheatsheaf.
- Magee, J. C., & Galinsky, A. D. (2008). Social hierarchy: The self-reinforcing nature of power and status. *Academy of Management Annals*, 2, 351-398.
- Morison, S., Marley, J., Stevenson, M., & Milner, S. (2008). Preparing for the dental team: investigating the views of dental

and dental care professional students. *European journal of Dental Education*, 12(1), 23-28.

Munkes, J., & Diehl, M. (2003). Matching or Competition? Performance Comparison Processes in an Idea Generation Task. *GPIR*, 6(3), 305-320.

Nunnally, J. (1978). *Psychometric theory*. New York/London: McGraw-Hill.

Nunnally, J., & Bernstein J.C. (1994). *Psychometric theory*. New York/London: McGraw-Hill.

Prochaska, J.O., DiClemente, C.C., & Norcross, J.C. (1992). In search of how people change: Applications to addictive behaviors. *American Psychologist*, 47(9), 1102-1114.

Postmes, T., Haslam, S.A., & Swaab, R.I. (2005). Social influence in small groups: An interactive model of social identity formation. *European Review of Social Psychology*, 16(1): 1-42.

Reeves, S., Fletcher, S., Barr, H., Birch, I., Boet, S., Davies, N., et al. (2016). A BEME systematic review of the effects of interprofessional education: BEME Guide No. 39. *Medical Teacher*, 38(7), 656-68.

Reinders, J.J., Krijnen, W.P., Stegenga, B., & van der Schans, C.P. (2017). Perceived Dentists and Dental Hygienist Task Distribution After A Dental and Dental Hygiene Students' Team Intervention. *Journal of Dental Education*, 81, 413-419.

Roger, D. B., & Schumacher, A. (1983). Effects of individual differences on dyadic conversational strategies. *Journal of Personality and Social Psychology*, 45, 700-705.

Ross, M.K., Turner, S., & Ibbetson, R.J. (2009). The impact of teamworking on the knowledge and attitudes of final year dental students. *British Dental Journal*, 206(3), 163-67.

Stichler, J. F. (1995). Professional interdependence: The art of collaboration. *Advanced Practice Nursing Quarterly*, 1, 53-61.

Tabachnick, B.G., & Fidell, L.S. (2001). Principal components and factor analysis. In *Using multivariate statistics* (4th ed., pp. 582-633). Needham Heights, MA: Allyn & Bacon.

Tajfel, H., & Turner, J.C. (1979). An integrative theory of intergroup conflict. In W.G.Austin, S.Worchel (Eds), *The Social Psychology of Intergroup Relations* (pp.33-47). Monterey, CA: Brooks-Cole.

Ten Have, P. (1991). Talk and institution: A reconsideration of the 'asymmetry' of doctor-patient interaction. In D. Boden, & D.H. Zimmerman (Eds.), *Talk and social structure: Studies in ethnomethodology and conversation analysis* (pp. 138-163). Cambridge: Polity Press.

Thistlethwaite, J., & Moran, M. on behalf of the World Health Organization Study Group on Interprofessional Education and Collaborative Practice (2010). Learning outcomes for interprofessional education (IPE): Literature review and synthesis. *Journal of Interprofessional Care*, 24, 503-513.

West, C. (1979). Against our will: Male interruptions of females in cross-sex conversation. *Annals of the New York Academy of Sciences*, 327, 81-97.

Wasserstein R.L., & Lazar N.A. (2016) The ASA's Statement on p-Values: Context, Process, and Purpose. *The American Statistician*, 70(2), 129-133.

Wenga, Q., & Carlsson, F. (2015). Cooperation in teams: The role of identity, punishment, and endowment distribution. *Journal of Public Economics*, 126, 25-38.

Wilkinson, L., & APA Task Force on Statistical Inference. (1999). Statistical methods in psychology journals: Guidelines and explanations. *American Psychologist*, 54, 594-604.

Yu, E., & Wright, S.M. (2015). "Beginning with the end in mind": Imagining personal retirement speeches to promote professionalism. *Academic Medicine*, 90, 790-793.

Yukelson, D., Weinberg, R., & Jackson, A. (1984). A multi-dimensional group cohesion instrument for intercollegiate basket-ball teams. *Journal of Sport Psychology*, 6, 103-117.



# CHAPTER 6

---

## Perceived interprofessional task distribution after a mixed student group formation intervention

Jan Jaap Reinders

Wim P. Krijnen

Boudewijn Stegenga

Cees P. Van der Schans

Reinders, J.J., Krijnen, W.P., Stegenga, B., Van der Schans, C.P. (2017).  
Perceived Dentist and Dental Hygienist Task Distribution After Dental  
and Dental Hygiene Students' Team Intervention.  
*Journal of Dental Education*, 81(4), 413-419.

**Abstract**

**Purpose** - Attitudes of dental students regarding the provision of treatment tend to be dentist-centered, however, facilitating mixed student group formation could change such perceptions. The purpose of this study is to investigate the perceived scope of practice of dental and dental hygiene students and whether task distribution can change following an educational intervention consisting of feedback, intergroup comparison and competition between mixed profession groups.

**Methods** - The study employed a pretest posttest single group design. Third-year dental students and second-year dental hygiene students were randomly assigned to mixed profession groups (four or five members) and received group-based performance feedback and intergroup comparison. The intervention was finalized with an award ceremony for the best interprofessional team. Before and after the intervention, students filled in a questionnaire measuring perceived distribution of ten tasks between dentists and dental hygienists.

**Results** - All students share perceptions regarding teeth cleaning ( $p=.372$ ,  $p=.404$ ) and, after the intervention, preventive tasks ( $p=.078$ ). Following the intervention, dental students considered four out of ten tasks as less dentist-centered: x-ray for periodontal diagnosis ( $p=.003$ ); local anesthesia ( $p=.037$ ); teeth cleaning ( $p=.037$ ); and periodontal treatment ( $p=.045$ ). Dental hygiene students perceived one task as being less dentist-centered after the intervention: x-ray for cariologic diagnosis ( $p=.041$ ).

**Conclusion(s)** - Dental and dental hygiene students have different opinions regarding the scope of practice. The number of redistributed tasks after the intervention is especially substantial among dental students, however, the amount of change per task is minimal. Half of all tasks become less dentist-centered as a result of the intervention.

**Introduction**

Dentists and dental hygienists work together and are, by changed legislation, allowed to perform a number of similar tasks that, traditionally, were only performed by dentists (Johnson, 2009). Attitudes of dentists regarding the provision of treatment tend to be dentist-centered and are present already at the undergraduate level (Ross et al., 2009; Lewitt et al., 2010). Such profession-specific mentalities regarding health care can reveal hierarchical perceptual differences that may complicate collaboration (Palaganas, Epps & Raemer, 2014; Morison et al., 2008; Ross et al., 2009). Dental students indeed perceive dental hygienists as assistants of dentists while dental hygiene students consider dental hygienists as independent professionals (Morison et al., 2008). The harmony of the intergroup relationship is least



threatened when professional groups concur with each other's distinctive characteristics (Hean et al., 2006). Interprofessional competition in response to task shifting can polarize the relationship between dentistry and dental hygiene (Knevel et al., 2016) and may lead to underutilization of the dental hygienist (Knevel et al., 2016; Capaciteitsorgaan, 2013). Such interprofessional competition is present already at the undergraduate level (Lewitt et al., 2010). Therefore, it is vital to improve the collaborative relationship between dental and dental hygiene students in order to optimize task distribution between these professions.

Dental and dental hygiene students having a reciprocal perception of each other as members of the same group rather than considering each other as members of distinct groups will likely facilitate a willingness to share tasks (Yukelson, Weinberg & Jackson, 1984; Guzzo, 1995). The mere existence of a group is based on the perception of unity and coherence between individuals and is referred to as entitativity (Campbell, 1958). Entitativity is based on three aspects: common fate, similarity, and proximity. Common fate can be enhanced by facilitating interdependence within a mixed profession group by group-based performance feedback (Rabinovich & Morton, 2015; Kim & Pentland, 2009; Matz & Wood, 2005; Smith & Kight, 1959). Similarity is enhanced by group identification which can be promoted by intergroup comparison (Turner & Bourhis, 1996) which should be based on an evaluative dimension related to the desired group identity (Ellemers & Van Knippenberg, 1997; Ouwerkerk & Ellemers, 2002); in this case, an interprofessional group identity. Group identification is also an indirect determinant of behaviors that may benefit in-group members (Bergami & Bagozzi, 2000). By introducing other groups (out-groups) that can be compared on a similar dimension, subgroup competition within a mixed profession group can also be avoided (Munkes & Diehl, 2003). According to the intergroup competition-intragroup cooperation hypothesis, cooperation within a group will increase due to competition with other groups (Böhm & Rockenbach, 2013). Proximity can be enhanced by composing small groups in which group cohesion is more likely to increase compared with larger groups (Widmeyer, Brawley, & Carron, 1990). Greater perceived cohesion produces more commitment to a group and is a direct determinant of behaviors that benefit in-group members (Bergami & Bagozzi, 2000). Thus far, no intervention has been investigated which is based on the combination of group-based performance feedback, intergroup comparison, and intergroup competition between mixed profession groups.

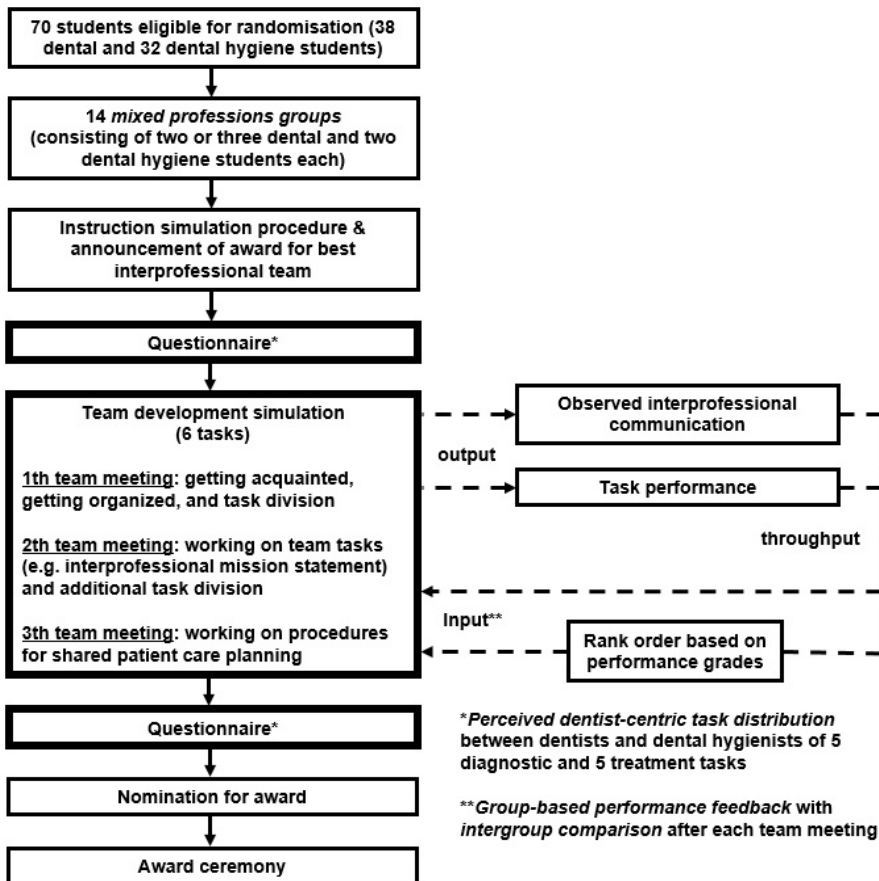
The purpose of this study is to investigate the perceived scope of practice of dental and dental hygiene students and whether distinguished interprofessional task distribution can change due to an educational intervention comprising the combination of group-based performance feedback, intergroup comparison, and intergroup competition between mixed profession groups.

**Materials and Methods**

The study employed a pretest posttest single group design (Figure 1). All participants were instructed about the study and informed they could withdraw at any given time. Full anonymity was guaranteed to all participants who were third-year dental students of the University of Groningen and second-year dental hygiene students of the Hanze University of Applied Sciences. The Institutional Review Board of the Hanze University of Applied Sciences approved this study.

**Figure 1.**

Flow chart of study design: mixed profession group formation facilitated by group-based feedback, intergroup comparison, and intergroup competition.



### *Characteristics and organization of the intervention*

The mixed profession groups simultaneously received group-based feedback on their group performance and were encouraged to compare their results with other mixed profession groups while participating in a competition during which the best performing interprofessional team was selected.

A convenience sample consisting of seventy dental and dental hygiene students were randomly allocated to groups consisting of five to six members (Figure 1). Each group worked autonomously in separate rooms and received the same tasks, objectives, and assessment criteria. Students were instructed to develop a collaborative practice. All groups were performing six team development tasks in three sessions of two hours each. The team development tasks consisted of an interprofessional mission statement, guidelines for task and role division, a plan to set up a practice space, a marketing plan, a legislation protocol (concerning a complaints procedure and professional responsibilities), and a collaboration protocol. Predefined criteria were provided to all students for each of these tasks. During the intervention, all groups received standardized feedback five hours after each group meeting. This group-based feedback concerned group dynamics (interprofessional equality), efficiency, and quality of work. After each group meeting, feedback was provided on the progress of each group in comparison to the other groups.

### *Questionnaires*

Before and after the team development sessions, students filled in a questionnaire regarding perceived task distribution between dentists and dental hygienists (Figure 1). The measurement of this task distribution between dentists and dental hygienists was based on a list of five diagnostic and five treatment tasks of which two tasks are invasive procedures (Table 1). An invasive procedure is a task or treatment that requires incision into the body or the removal of tissue. These tasks are allowed, according to Dutch legislation, to be performed by both dentists and dental hygienists (Jerkovic et al., 2010). The ten tasks were scored on a 9-point scale ranging from (1=) 'only belongs to the dental hygienist' to (5=) 'just as much a task of dentists as of dental hygienists' to 9= 'only belongs to the dentist'. To enhance further interpretation, values 1 through 3 were classified as 'dental hygienist core task' while values 7 through 9 were classified as 'dentist core task' or 'dentist-centered task'. All other values were classified as 'shared task'.

**Table 1.**

Tasks to distribute as perceived by dental and dental hygiene students

	<b>Task</b>	<b>Diagnosis or treatment</b>	<b>Invasive or non-invasive*</b>
1	Preventive tasks	Treatment	Non-invasive
2	Teeth Cleansing	Treatment	Non-invasive
3	Periodic Oral Evaluation	Diagnosis	Non-invasive
4	Cariologic X-ray	Diagnosis	Non-invasive
5	Periodontal X-ray	Diagnosis	Non-invasive
6	Cariologic Diagnosis	Diagnosis	Non-invasive
7	Periodontal Diagnosis	Diagnosis	Non-invasive
8	Cariologic Treatment	Treatment	Invasive
9	Periodontal Treatment	Treatment	Non-invasive
10	Local Anesthesia	Treatment	Invasive

\*An invasive procedure is a task or treatment that requires incision into the body or the removal of tissue.

### *Analyses*

The paired-sample t-test was employed separately for the dental and the dental hygiene group to analyze differences in mean perceived task distribution before and after intervention. The independent t-test was used to investigate differences between the two professions before and after the educational intervention with regard to perceived task distribution.

## **Results**

### *Participants*

In this study, 38 dental students (21 male, 17 female) and 32 dental hygiene students (1 male, 31 female) participated. Questionnaires were completed by a total of 88.4% (n=61) of the participants; more specifically, by 34 dental (89.5%) and 27 dental hygiene students (84.4%).

### *Comparison of dental and dental hygiene students: scope of practice*

In Table 2, group means and standard deviations of perceived task distribution are reported. It can be observed that dental and dental hygiene students perceive the scope of practice differently with one exception. Before and after the intervention, no significant difference in mean was determined between dental and dental hygiene students with regard to the distribution of teeth cleaning (p=.372 and p=.404). The group means indicate that both groups perceived this as a core dental hygienist task. Following the intervention, no differences were

ascertained between dental and dental hygiene students with regard to preventive tasks. Both student groups perceive this as a core dental hygienist task ( $p=.078$ ).

**Table 2.**

Comparison of task distribution between dentists and dental hygienists as perceived by dental and dental students

Task	Before the experiment					After the experiment				
	Dental students (n=34)		Dental Hygiene students (n=27)		Independent t-test	Dental students (n=34)		Dental Hygiene students (n=27)		Independent t-test
	Mean	SD	Mean	SD	P	Mean	SD	Mean	SD	P
1 Preventive tasks	4.2	1.1	3.4	1.1	.009	3.7	1.3	3.2	1.2	.078
2 Teeth Cleansing	3.4	1.0	3.2	0.9	.372	2.8	1.2	2.6	1.2	.404
3 Periodic Oral Evaluation	6.7	1.2	5.2	1.5	<.001	6.9	1.4	5.1	1.5	<.001
4 Cariologic X-ray	6.8	1.4	6.2	1.0	.010	7.2	1.3	5.8	1.0	<.001
5 Periodontal X-ray	6.0	1.2	4.3	1.6	<.001	5.4	1.4	3.9	1.3	<.001
6 Cariologic Diagnosis	7.4	1.0	6.2	1.0	<.001	7.5	1.0	6.3	1.3	<.001
7 Periodontal Diagnosis	6.4	1.4	3.8	1.4	<.001	5.4	1.7	3.6	1.4	<.001
8 Cariologic Treatment	7.1	1.0	6.0	1.2	.001	7.2	1.1	6.2	1.2	<.001
9 Periodontal Treatment	4.9	1.3	3.3	1.7	<.001	4.3	1.5	2.9	1.3	<.001
10 Local Anesthesia	6.4	1.3	5.2	0.7	<.001	6.2	1.6	5.2	0.7	<.001

Perceived task distribution: 9-point scale ranging from 1= 'only belongs to the dental hygienist', 5= 'just as much a task of dentists as of dental hygienists', to 9= 'only belongs to the dentist'.

*Change after the experiment*

In Table 3, means and standard deviations of pretest and posttest measures of perceived task distribution are reported. It can be observed that means especially changed among dental students after the intervention. Four tasks are regarded as less dentist-centered among dental students after the intervention: periodontal x-ray ( $p=.003$ ); local anesthesia ( $p=.037$ ); teeth cleaning ( $p=.037$ ); and periodontal treatment ( $p=.045$ ). Dental hygiene students perceived one task as less dentist-centered after the intervention. X-ray for cariologic diagnosis was considered to be almost a core dentist task before the intervention whereas, after the intervention, this task was less profession-centered but more equally shared according to dental hygiene students ( $p=.041$ ).

**Table 3.**

Pretest and posttest measures of perceived task distribution between dentists and dental hygienists according to dental and dental hygiene students

Task	Dental students (n=32)			Dental Hygiene Students (n=27)		
	T0 Mean (SD)	T1 Mean (SD)	Paired Samples T-test P	T0 Mean (SD)	T1Mean (SD)	Paired Samples T-test P
1 Preventive tasks	4.1 (1.1)	3.7 (1.2)	.070	3.4 (1.1)	3.2 (1.2)	.421
2 Teeth Cleansing	3.5 (1.1)	3.1 (1.1)	.037	3.2 (0.9)	2.8 (1.1)	.054
3 Periodic Oral Evaluation	6.7 (1.2)	6.7 (1.3)	1.000	5.2 (1.5)	4.9 (1.4)	.235
4 Cariologic X-ray	6.9 (1.2)	7.0 (1.1)	.609	6.2 (1.0)	5.7 (1.0)	.041
5 Periodontal X-ray	6.1 (1.2)	5.3 (1.3)	.003	4.3 (1.6)	4.0 (1.3)	.403
6 Cariologic Diagnosis	7.3 (0.9)	7.5 (0.9)	.458	6.2 (1.0)	6.3 (1.4)	.787
7 Periodontal Diagnosis	6.3 (1.4)	6.0 (1.6)	.211	3.8 (1.4)	4.0 (1.5)	.542
8 Cariologic Treatment	7.1 (1.0)	7.0 (1.0)	.675	6.0 (1.2)	6.2 (1.2)	.434
9 Periodontal Treatment	4.8 (1.1)	4.3 (1.2)	.045	3.3 (1.7)	3.1 (1.2)	.294
10 Local Anesthesia	6.4 (1.3)	6.0 (1.2)	.037	5.2 (0.7)	5.3 (0.7)	.602

Perceived task distribution: 9-point scale ranging from 1= 'only belongs to the dental hygienist', 5= 'just as much a task of dentists as of dental hygienists', to 9= 'only belongs to the dentist'.

## Discussion

Dental and dental hygiene students had different perceptions on the distribution of the majority of professional tasks. After the intervention, consensus between dental and dental hygiene students increased by one additional task, specifically, preventive tasks. Teeth cleaning was considered a dental hygienist core task before and after the educational intervention while preventive tasks were only considered dental hygienist core tasks after the intervention.

The number of changed tasks among dental students is substantial, however, the degree of change per task is minimal. The perceived distribution of four out of ten tasks became less dentist-centered among dental students after the intervention. This concerned x-rays for periodontal diagnosis, local anesthesia, teeth cleaning, and periodontal treatment.

Dental and dental hygiene students have shared, but also different, perceptions with regard to their scope of practice. Historically, teeth cleaning has been the core task of the dental hygienist (Fones, 1934). Therefore, it is not surprising that no differences were found between the students of the two professions before and after the intervention. Internationally, dentists and professional dental organizations agree this is a dental hygienist core task (e.g., General Dental Council, 2013; Dental Council, 2010; Adams, 2004; Frandsen, 1986). Dental students perceive cariologic tasks especially as core dentist tasks. Another pattern is that diagnostic tasks and invasive tasks are also considered dentist core tasks. However, dental students only relinquish tasks that are not related to those that are cariologic. Yet, thorough oral examinations for disease (such as an x-ray for cariologic diagnosis) should be a component of dental hygiene practice when preventing cariologic disease is important (Barnes, 2005). Tasks related to this diagnosis and the treatment are perceived as a restricted area of the dental profession and are considered the most dentist-centered tasks before and after the intervention. Therefore, it is likely these tasks define the professional identity of the (future) dentist and their symbolic and distinctive value might be too significant to share (Omark, 1978). In other words, it is possible that changing interprofessional task distribution between dental and dental hygiene students is restricted to all non-cariologic tasks no matter what type of intervention is applied. The same could possibly apply to the dental hygiene profession. Dental hygiene students perceive prevention, teeth cleaning, and periodontal treatment as their core tasks. However, the dental hygiene profession is a professionalizing occupation and, therefore, cannot share the same characterization as the established dental profession. The Professional Project Model of Macdonald (1999) predicts that the priority of a professionalizing occupation or aspiring profession, such as dental hygiene (Adams, 2004), is to pursue social acceptance and, thus, full professional status with corresponding autonomy. On the other hand, the first priority of an aspiring profession is to claim a unique area of expertise while task shifting does the opposite; it enhances similarity between these professions. Retaining certain specific core tasks could be the solution for maintaining enough professional distinctiveness between dentistry and

dental hygiene.

The task distribution after the intervention, according to dental students, became slightly less dentist-centered with regard to more tasks compared to dental hygiene students. This is an indication that this specific intervention can influence the desired interprofessional equality. Previously, it was argued that the dominant profession would relinquish more tasks to the other profession when all are members of the same group. However, this effect is minimal. Still, both established and aspiring professions not only focus on the protection and maintenance of their occupational boundaries, they also want to expand areas of control (Macdonald, 1995, Larson, 1977). The need for professional control could possibly be somewhat decreased by the intervention. Continuing interprofessional education (IPE) might further enhance the desired effects. If so, this intervention should be applied for a longer time period. The theory behind this educational intervention requires additional research in order to substantiate its usefulness.

Increasing the duration of the intervention can plausibly produce greater effects; this type of intervention can also produce effects in a relatively short time (six hours in three sessions). The duration of an intervention to influence a shift of tasks and responsibilities between a GP and a practice nurse lasted sixteen hours in four sessions (Oeseburg et al., 2013). The application of the intergroup competition-intragroup cooperation hypothesis (Böhm & Rockenbach, 2013) to mixed profession group formation might be more effective than traditional discussion groups. However, it is unlikely that this will be sufficient since a group could also develop a harmonious but mutually maintained hierarchical culture. Therefore, a group culture of equality should also be influenced in order to guarantee both group commitment and interprofessional behavior. Conventional IPE often promotes the engagement of students by discussion whereas simulation-enhanced IPE facilitates student participation in a more realistic environment with more practical social interaction (Palaganas et al., 2014).

A limitation of this study is its pre-test post-test single group design. Without comparing experimental and control conditions, results must be interpreted with care. Perceived task distribution changed over time but was different per profession. Therefore, it is unlikely that the outcome of this study can be explained by maturation.

The pretest could possibly have influenced the outcome. However, students were not aware that 'perceived dentist-centered task distribution' was measured. Instead, task distribution between dentists and dental hygienists was measured with 'core dentist task' as the highest value. Therefore, it is unlikely the results can be explained by test reactivity.

All students were randomly assigned to their group. Therefore, it is unlikely that group composition was based upon already established relationships between members of the same profession.



Briefly, dental and dental hygiene students have different perceptions about the scope of practice. The number of redistributed tasks after the intervention is especially substantial among dental students, however, the amount of the change per task is minimal. Half of all tasks become less dentist-centered. This study provides an indication of the effect of an educational intervention based on group-based performance feedback, intergroup comparison, and intergroup competition between mixed profession groups can change perceived task distribution.

## References

- Abelsen, B. & Olsen, J.A. (2008). Task division between dentists and dental hygienists in Norway. *Community Dentistry and Oral Epidemiology*, 36, 558-566.
- Abbott, A. (1988). *The System of Professions*. Chicago, IL: University of Chicago Press.
- Adams, T. (1999). Dentistry and medical dominance. *Social Science & Medicine*, 48, 407- 20.
- Adams, T.L. (2004). Inter-professional conflict and professionalization: dentistry and dental hygiene in Ontario. *Social Science & Medicine*, 58, 2243-2252.
- Allport, G.W. (1954). *The nature of prejudice*. Cambridge, MA: Perseus Books.
- Barnes, C.M. (2005). Incipient and Hidden Caries. *The Dental Clinics of North America*, 49(4), 795-813.
- Barr, H., Freeth, D., Hammick, M., Koppel, I. & Reeves, S. (2005). *Effective interprofessional education: argument, assumption and evidence*. London: Blackwell Publishing.
- Bergami, M. & Bagozzi, R.P. (2000). Self-categorization, affective commitment and group self-esteem as distinct aspects of social identity in the organization. *British Journal of Social Psychology*, 39(4), 555-577.
- Böhm, R. & Rockenbach, B. (2013). The inter-group comparison-intra-group cooperation hypothesis: comparisons between groups increase efficiency in public goods provision. *PLoS One*, 8(2), e56152.
- Campbell, D.T. (1958). Common fate, similarity, and other indices of the status of aggregates of person as social entities. *Behavioural Science*, 3, 14-25.
- Capaciteitsorgaan (2013). *Capaciteitsplan 2013. Voor de medische, tandheelkundige, klinisch technologische en aanverwante (vervolg)opleidingen*. Utrecht: Stichting Capaciteitsorgaan voor Medische en Tandheelkundige Vervolgopleidingen, 24,25, 33, 44, 59, 76, 87.
- Coffin, D. (1997). Hygiene's competitive challenge to dentistry. *Journal of the Canadian Dental Association*, 63 (8), 576.
- DeAngelis, S. & Goral, V. (2000). Utilization of local anesthesia by Arkansas dental hygienists, and dentists' delegation/ satisfaction relative to this function. *Journal of Dental Hygiene*, 74(3), 196-204.
- Dixon-Woods, M., Baker, R., Charles, K., Dawson, J., Jerzembek, G., Martin, G., McCarthy, I., McKee, L., Minion, J., Ozieranski, P., Willars, J., Wilkie, P. & West, M. (2014). Culture and behavior in the English National Health Service: overview of lessons from a large multimethod study. *BMJ Quality & Safety*, 23(2), 106-115.
- Ellemers, N. & van Knippenberg, A. (1997). Stereotyping in Social Context. In R. Spears, P.J. Oakes, N. Ellemers, S.A. Haslam (Eds.), *The Social Psychology of Stereotyping and Group Life* (pp 208-235). Cambridge, MA: Blackwell.
- Gaertner, S.L., & Dovidio, J.F. (2000). *Reducing Intergroup Bias: The Common Ingroup Identity Model*. Philadelphia: Psychology Press.
- General Dental Council (2013). *Scope of practice. Protecting patients, regulating the dental team*. [www.gdc-uk.org](http://www.gdc-uk.org), retrieved:

16th May 2016.

Dental Council (2010). *Scope of practice. Ireland*. retrieved: [www.dentalcouncil.ie](http://www.dentalcouncil.ie) 16th May 2016.

Fones, A.C. (1934). *Mouth hygiene*. Philadelphia (PA): Leas & Febiger.

Frandsen, A. (1986). Mechanical Oral Hygiene Practices. In H. Loe & D.V.Kleinman (Eds.), *Dental Plaque Control Measures and Oral Hygiene Practice* (pp 93-116). Oxford: IRL Press.

Grant, R.W. & Finnocchio, L.J. (1995). *California Primary Care Consortium Subcommittee on Interdisciplinary Collaboration. Interdisciplinary Collaborative Teams in Primary Care: A Model Curriculum and Resource Guide*. San Francisco, CA: Pew Health Professions Commission.

Guzzo, R.A. (1995). At the intersection of team effectiveness and decision making. In R.A.Guzzo, & E. Salas (Eds.), *Team Effectiveness and Decision Making in Organizations* (pp 1-8). San Francisco: Jossey-Bass.

Hall, P. (2005). Interprofessional teamwork: Professional cultures as barriers. *Journal of Interprofessional Care*, 19(1), 188-196.

Hean, S., Macleod Clark, J., Adams, K. & Humphri, D. (2006). Will opposites attract? Similarities and differences in students' perceptions of the stereotype profiles of other health and social care professional groups. *Journal of Interprofessional Care*, 20 (2), 162-181.

Jerkovic, K., van Offenbeek, M.A.G., Slot, D.E., & Van der Schans, C.P. (2010). Changes in the professional domain of Dutch dental hygienists. *International Journal of Dental Hygiene*, 8, 301-307.

Johnson, P.M. (2009). International profiles of dental hygiene 1987 to 2006: a 21-nation comparative study. *International Dental Journal*, 59, 63-77.

Kim, T. & Pentland, A. (2009). *Understanding effects of feedback on group collaboration. Papers from the AAAI Spring Symposium: Human Behavior Modeling (Technical Report SS-09-04)* Menlo Park, CA: The AAAI Press.

Knevel, R., Gussy, M.G., Farmer, J. & Karimi, L. (2016). Nepalese dental hygiene and dentistry students towards the dental hygienists profession. *International Journal of Dental Hygiene*, doi: 10.1111/idh.12192. [Epub ahead of print]

Larson, M.S. (1977). *The Rise of Professionalsim: a Sociological Analysis*. Berkely: University of California Press.

Lewitt, M.S., Ehrenborg, E., Scheja, M., & Brauner, A. (2010). Stereotyping at the undergraduate level revealed during interprofessional learning between future doctors and biomedical scientists. *Journal of Interprofessional Care*, 24(1), 53-62.

Macdonald, K.M. (1999). *The sociology of the professions*. London: Sage.

Matz, D.C. & Wood W. (2005). Cognitive dissonance in groups: The consequences of disagreement. *Journal of Personality and Social Psychology*, 88, 22-37.

Morison, S., Marley, J., Stevenson, M. & Milner, S. (2008). Preparing for the dental team: investigating the views of dental and dental care professional students. *European Journal of Dental Education*, 12(1), 23-28.

- Munkes, J. & Diehl, M. (2003). Matching or Competition? Performance Comparison Processes in an Idea Generation Task. *GPIR*, 6(3), 305-320.
- Oeseburg, B., Hilberts, R., Luten, T.A., van Etten, A.V.M., Slaets, J.P.J., & Roodbol, P.F. (2013). Interprofessional education in primary care for the elderly: a pilot study. *BMC Medical Education*, 13, 161.
- Omark, R.C. (1978). Training therapy of psychotherapists: professional socialization as interprofessional relations. *Psychological Reports*, 42, 1307-1310.
- Ordell, S. (2011). Organisation and management of public dentistry in Sweden. Past, present and future. *Swedish Dental Journal*, 210, 10-92.
- Ouwerkerk, J.W. & Ellemers, N. (2002). The benefits of being disadvantaged: performance-related circumstances and consequences of intergroup comparisons. *European Journal of Social Psychology*, 32, 73-91.
- Palaganas, J.C., Epps, C., & Raemer, D.B. (2014). A history of simulation-enhanced interprofessional education. *Journal of Interprofessional Care*, 28(2), 110-115.
- Rabinovich, A. & Morton, T.A. (2015) Things we (don't) want to hear: Exploring responses to group-based feedback, *European Review of Social Psychology*, 26(1), 126-161.
- Raghoobar-Krieger, H.M.J., Tams, J., Molenaar, W.M., & Huysmans, M.C.D.N.J.M. (2006). Keuzeonderwijs tandheelkunde in Groningen: een analyse van de operationalisatie van kerndoelen en het bereik ervan. *Tijdschrift voor Medisch Onderwijs*, 25(1), 14-21. *Dutch*
- Reeves, S., Macmillan, K. & Van Soeren M. (2010). Leadership of interprofessional health and social care teams: a socio-historical analysis. *Journal of Nursing Management*, 18(3), 258-264.
- Reeves, S., Perrier, L., Goldman, J., Freeth, D. & Zwarenstein, M. (2013). Interprofessional education: effects on professional practice and healthcare outcomes (update). *Cochrane Database of Systematic Reviews*, 28; 3.
- Ritchie, C., Dann, L., & Ford P. (2013). Shared learning for oral health therapy and dental students: enhanced understanding of roles and responsibilities through interprofessional education. *European Journal of Dental Education*, 17(1), e56-63.
- Ross, M.K., Turner, S., & Ibbetson, R.J. (2009). The impact of teamworking on the knowledge and attitudes of final year dental students. *British Dental Journal*, 206, (3), 163-167.
- Sisty-LePeau, N., Boyer, E.M. & Lutjen, D. (1990). Dental hygiene licensure specifications on pain control procedures. *Journal of Dental Hygiene*, 64, 179-185.
- Sisty-LePeau, N., Nielson-Thompson, N. & Lutjen, D. (1992). Use, need and desire for pain control procedures by Iowa Hygienists. *Journal of Dental Hygiene*, 66, 137-146.
- Smith, E.E. & Kight, S.S. (1959). Effects of feedback on insight and problem solving efficiency in training groups. *Journal of Applied Psychology*, 43, 209-211.
- Stichler, J.F. (1995). Professional interdependence: The art of collaboration. *Advanced Practice Nursing Quarterly*, 1, 53 – 61.

- Swanson Jaecks, K.M. (2009) Current perceptions of the role of dental hygienists in interdisciplinary collaboration. *Journal of Dental Hygiene*, 83(2), 84-91.
- Turner, J. C. & Bourhis, R. Y. (1996). Social identity, interdependence and the social group: A reply to Rabbie et al. In W. P. Robinson (Ed.), *Social Groups and Identities: Developing the Legacy of Henri Tajfel* (25-63). Oxford, England: Butterworth-Heinemann.
- Walsh, M. E., Brabeck, M. M., & Howard, K. A. (1999). Interprofessional collaboration in children's services: Toward a theoretical framework. *Children's Services: Social Policy, Research, & Practice*, 2, 183 – 208.
- Weiss, S.J., & Davis, H.P. (1985). Validity and reliability of collaborative practice scales. *Nursing Research*, 34,299-305.
- Widmeyer, W., Brawley, L., & Carron, A. (1990). Group size in sport. *Journal of Sport & Exercise Psychology*, 12, 177-190.
- Young, R. & Milanovic, M. (1992). Discourse variation in oral proficiency interviews. *Studies in Second Language Acquisition*, 14, 403-424.
- Youngquist, J. (2009). The effect of interruptions and dyad gender combination on perceptions of interpersonal dominance. *Communication Studies*, 60, 147-163.
- Yukelson, D., Weinberg, R., & Jackson, A. (1984). A multi-dimensional group cohesion instrument for intercollegiate basket-ball teams. *Journal of Sport Psychology*, 6, 103-117.



# CHAPTER 7

---

Summary & general introduction

The purpose of this dissertation was to explore attitudes and considerations related to task shifting between dentists and dental hygienists and to investigate the effect of a psychological intervention in an educational setting on interprofessional communication and perceptions regarding interprofessional task distribution.

## **7.1 Main findings**

Dentists and dental hygienists have different attitudes with regard to task shifting, especially concerning dental hygiene independent practice which is least desired by dentists. Dentists and dental hygienists consider different issues when favoring or opposing this policy. The nature of their interprofessional relationship is evident in the attribution of profession-specific social characteristics. Dental and dental hygiene students agree that dentists are more dominant than dental hygienists. Facilitated interprofessional group formation can reduce interprofessional hierarchy as well as dentist-centric task distribution.

The first study (Chapter 2) revealed a gap between dentists and dental hygienists with regard to the extended scope of dental hygiene practice. Half of all dentists and most dental hygienists have a positive attitude towards it. An interprofessional gap is determined regarding independent dental hygiene practice. A minority of all dentists have a positive attitude towards independent dental hygiene practice compared to a majority of all dental hygienists. This suggests that acceptance of dental hygiene independence is a considerable an obstacle to overcome when implementing task shifting. Dentists would like to maintain control over the dental hygiene practice (Adams, 2004; Adams, 1999; Konzelmann & Yokom, 1997), therefore, task delegation is likely to be more preferred than task substitution which concerns task shifting with professional autonomy (Sibbald, Laurant & Scott, 2006; Sibbald, Shen & McBride, 2004).

The second study (Chapter 3) revealed that flexible collaboration is the perceived advantage of task shifting and, therefore, it can be a strategy for improving interprofessional collaboration. This becomes more successful when task shifting is not perceived as an intergroup threat.

Most issues considered by dental hygienists are related to job content and professional identity. New style dental hygienists, dental hygienists with an extended scope of practice, experience less job satisfaction when they perceive less autonomy (Jerković-Ćosić, van Offenbeek & van der Schans, 2012). Even if dental hygienists are willing to perform new treatment measures, the traditional methods of delegating tasks can prevent them from doing so (Virtanen et al., 2011). A lack of autonomy can be a reason for leaving the dental hygiene practice (Johns, Gutmann, DeWald & Nunn, 2001). Also, a variety in the scope of practice is related to job satisfaction (Calley, Bowen, Darby & Miller, 1996; Jerković-Ćosić et al., 2012).



Besides factors related to job satisfaction, dental hygienists also reported professional identity as a reason in favor of task shifting. This did not appear to be an issue to the dentists involved. The importance of task shifting to dental hygienists could be explained by the pursuit of a full professional status which is common among professionalizing occupations (Macdonald, 1995).

This study revealed opposing views between dentists and dental hygienists with regard to quality of care. Many dental hygienists perceive themselves as competent; however, dentists generally do not share this view as a consideration for task shifting. This could be explained by the lack of knowledge regarding the competence of dental hygienists or it may possibly originate from ulterior motives such as protecting economic interests.

The third study (Chapter 4) revealed shared perceptions of dental and dental hygiene students with regard to the social attributes of dentists. Dentists are perceived as being more assertive and dominant compared to dental hygienists but equally respectful. Dominance differences between professions is acknowledged by the parties involved and, therefore, is not usually considered a problem (Leisnert, Axtelius, Johansson & Wennerberg, 2012). Dental students perceive assertiveness and dominance as slightly more distinctive regarding interprofessional differences. Dental and dental hygiene students especially identify with the social attributes of their own profession.

The fourth study (Chapter 5) concerned an intervention to influence the social interaction between dental and dental hygiene students through psychological group formation based on principles of social identity formation. A social identity is constructed by individuals through differentiation between groups (Barnes, Carpenter & Dickinson, 2000; Forgas & Williams, 2014). Therefore, it was expected that intergroup comparison would indirectly change hierarchical behavior between members of different professions through the formation of a mixed profession group identity. Not the identity, but the behavior, that was expected to be guided by a new social or group identity was measured and did reveal the hypothesized outcome. No conclusive evidence was found for change in professional positions, although interprofessional hierarchy decreased with the intervention. This finding is valuable to the quality of oral health care. A recent study ascertained evidence that interprofessional communication between dentists and dental hygienists influences dental treatment outcomes (Hamasaki, Kato, Kumagai & Hagihara, 2017).

In the fifth study (Chapter 6), the effect of an intervention on perceived task distribution between dentists and dental hygienists was investigated. This intervention was conducted in an educational setting with these students and concerned intergroup comparison of interprofessional interaction. Half of all of the basic dental tasks became less dentist-centered. The perceptions of dental students were especially changed following the intervention.

However, interprofessional task distribution of a caries diagnosis and caries treatment tasks were not changed after the intervention. This cannot be attributed to a lack of dental hygiene competence. Evidence reveals positive results with regard to a caries diagnosis, treatment, and restorative procedures performed by dental hygienists and dental hygiene students (e.g., Brocklehurst, Ashley, Walsh & Tickle, 2012; Daniel & Kumar, 2016; Macey, Glenny & Brocklehurst, 2015; Post & Stoltenberg, 2014; Öhrn, Crossner, Börgesson & Taube, 1996). It is more likely that these caries related tasks are of special interest to dental students and their profession. Specific professional tasks can have a symbolic value that can distinguish one profession from another (Omark, 1978). After all, distinctiveness is the basis of professional existence. This is also reflected in papers and policy statements regarding curriculum development for cariology which only targets dental schools and excludes dental therapist and/or dental hygiene schools (e.g., Fontana et al., 2016; Nascimento, Behar-Horenstein, Feng, Guzmán-Armstrong, Fontana, 2017; Schulte et al., 2011; Schulte, Pitts, Huysmans, Splieth & Buchalla, 2011; Anderson et al., 2011). This suggests that caries treatment related tasks are too strongly associated with the professional identity of dentists to alter perceptions with regard to the redistribution of these tasks. This redistribution seems to be more likely when dentists maintain the 'official ownership' of the task or have control over the delegated task at hand. This becomes apparent with the delegation of restorative procedures to Dutch dental assistants by dentists. Strangely enough, when restorative tasks are delegated to dental assistants, competence does not seem to be an argument against delegating restorative procedures. Dutch dental assistants can perform restorative procedures but receive much less training than new style Dutch dental hygienists (Northcott et al., 2013). In addition, one can also wonder whether every basic dental task could and should be redistributed between dentists and dental hygienists. It is doubtful that any team will benefit from becoming a too homogeneous collective. A team with no expert diversity is a team that will respond to its dynamic environment less effectively.

## **7.2 Towards an extended professional identity theory (EPIT)**

Demographic changes, technical advancements, patient safety, and workforce challenges necessitate new models of care organization (Thistlethwaite, 2012). Therefore, collaborative practice becomes increasingly important, and interprofessional teamwork receives worldwide attention (Reeves, Pelone, Harrison, Goldman & Zwarenstein, 2017; Reeves, Perrier, Goldman, Freeth & Zwarenstein, 2013). Teamwork can increase effectiveness and team adaptability depends on the diversity of its composition (Robbins & Judge, 2013). Thus, diversity in skills and expertise enables a team to adapt to a complex and dynamic environment. However, at the same time, team diversity poses a potential threat that can result in a loss or absence of group cohesion while the latter predicts team performance. Social or group behavior can limit effective collaboration because of intergroup behaviors within a team (Tajfel &

Turner, 1979; Tajfel & Turner, 1986; Denmark, 2010; Fiske, 1998). Team diversity manifests in social distinctions between its individual team members. When cooperating collectively in a work context and with different professional backgrounds, professional identity can emphasize these social distinctions. Interprofessional collaboration itself is often perceived as a professional identity threat (Aquino & Douglas, 2003; McNeil, Mitchell & Parker, 2014) and can lead to competition between members of different professions (McNeil, Rebecca, Mitchell & Parker, 2013). Professional identity and interprofessional collaboration constitute a paradox in which professional demarcation appears to be incompatible with the tendency to share tasks and autonomy with another profession. So far, there are few solutions for solving this 'paradox of Whittington' (Whittington, 2003), however, changing the professional identity is assumed to do so (Wackerhausen, 2009).

When team cohesion decreases because of internal competition, individual commitment to the team as a whole will also decrease. Commitment refers to the intensity in which individuals are psychologically connected to their group and how much they value their group membership (Lee, Carswell & Allen, 2000). It concerns the intention to perform a certain action, influence a certain outcome, or produce consequences that are perceived to be a social obligation and require an investment of personal or social resources (Baxter, 1990). Commitment to a group is voluntary and individuals may feel obligated to keep it.

Instead of team commitment, occupational commitment might become predominant in a mixed profession group when competitive triggers become a factor. This occupational commitment is an important component of professional identity (Alutto, Hrebiniak & Alonso, 1973) that guides professional behavior (Hogg, Van Knippenberg & Rast III, 2012). Therefore, professional identity is an important predictor of performance in the work place (Cohen, 2003). Positive emotions attributed by individuals to their occupational ingroup promote commitment to their ingroup while they also contribute to an increasing differentiation between ingroup and outgroup (Lawler, Thye & Yoon, 2008).

Differentiation in social categories is inherent to the stereotype concept (Linville, Salovey, Fischer, 1986). It is for this reason that the conventional approach in interprofessional education is used to dispel these occupational stereotypes. The main strategy to accomplish this is by facilitating social contact between different professional groups (Allport, 1954). Several studies confirm the effectiveness of this strategy and report positive changes in stereotypical perceptions (e.g., Barr, 2013; Mohaupt et al. 2012; Thistlethwaite, 2012; Evans, Henderson & Johnson, 2012). However, the results of Chapter 5 show that mere intergroup contact is not likely to change interprofessional communication in terms of reciprocal behaviors. An important explanation for this can be found in the 'anatomy' of the social identity. Occupational stereotypes are beliefs, and these are inherent to any social identity (Barbour & Lammers, 2015). Yet, social identity also consists of two other components: perceived

group membership and attachment. Perceived group membership concerns self-perceived membership of an existing group while attachment is related to the commitment to that group. Thus, even though interprofessional beliefs can be changed by disproving occupational stereotypes, interprofessional commitment is unlikely to be established when only applying the intergroup contact strategy. Since the commitment component of professional identity constitutes a potential problem to interprofessional collaboration, it might also be the key to solving the 'paradox of Whittington' (Whittington, 2003). For this reason, several authors are convinced that interprofessional collaboration should be enhanced by changing professional identity (e.g., Barnes et al., 2000; Stull & Blue, 2016; Lymbery & Postle, 2007; Langendyk, Hegazi, Cowin, Johnson & Wilson, 2015). However, the few contemporary theories that exist differ with regard to the appropriate strategy to do so.

One approach is to enhance interprofessional collaboration by weakening professional identity (Barnes et al., 2000; Stull & Blue, 2016). However, a weakened professional identity is associated with decreased professional meaningfulness and the decreased perceived value of an individual's own profession (Kremer & Hofman, 1985; Osborn & Broadfoot, 1992). Since professional uniqueness in interprofessional collaboration is all about added value, a weakened professional identity would jeopardize this. A number of authors emphasize the importance of strengthening professional identity instead of weakening it (Hammerness, Darling-Hammond & Bransford, 2005; Kardos & Moore, 2007). Individuals with a denigrated professional identity will be unable to manage different situations with diverse needs and expectations (Mikkelsen & Jourdenais, 2015).

Another potential approach is the formation of an additional identity which might solve interpersonal issues between members of different professions. However, this will potentially create a new problem as it is difficult to manage multiple identities (Dyble, 2012). This problem is of an intrapersonal nature. According to the identity theory (Stets & Burke, 2000), individuals choose between different roles or social identities. Each person organizes these identities into a salience hierarchy. This means that individuals choose between their different identities based on the perceived relevance and importance of a specific identity. Therefore, it would be impractical to switch between a professional and an interprofessional identity.

A more viable approach with regard to solving the paradox of Whittington (2003) was proposed by several authors (Lymbery & Postle, 2007; Langendyk et al., 2015) and regarded extending professional identity by integrating interprofessionalism into the existing professional identity. This perspective is in accordance with the concept that individuals have widening circles of group membership to which they have varying degrees of commitment (Turner, 1987). Also, Khalili, Orchard, Spence Laschinger and Farah (2013) introduced the concept 'dual identity'. This is a professional identity based on a "sense of belonging to, and simultaneously identify themselves with both individual's own profession and that of the

interprofessional community". However, the term 'dual identity' is also used as an important concept in the social movement literature (Klandermans, 2013) wherein "individuals hold multiple identities at the same time that do not necessarily work in the same direction". Since a professional identity with an interprofessional orientation should not lead to loyalty issues, 'dual identity' can be a confusing term to use. From a social psychological perspective, an interprofessional orientation should be an integrated part of professional identity in order to avoid conflicting roles (Dyble, 2012; Stets & Burke, 2000).

Another term used to describe a professional who is focused on interprofessional collaboration is 'T-shaped professional'. This concept originates from the field of ICT job recruitment, and the earliest reference is by David Guest in *The Independent* of September 17, 1991 (Conley, Foley, Gorman, Denham & Coleman, 2017). T-shaped professionals combine their own domain of expertise with broad complex-communication skills across many other domains in order to enable a more integrated approach to complex problems (Donofrio, Spohrer & Zadeh, 2010). Although the name 'T-shaped' describes or visualizes the desired behavioral outcome, it does not describe the cause of this behavior, i.e., the professional identity itself that also includes other disciplines. Therefore, a more appropriate name for a professional identity with an interprofessional orientation would be 'extended professional identity'. Because this concerns a social identity, the same principles of social identity formation should also apply to an extended professional identity, in this case, interprofessional membership, interprofessional membership beliefs, and interprofessional membership commitment (attachment).

### 7.2.1 Basic assumptions of the extended professional identity theory (EPIT)

Clues for how to change professional identity related to interprofessional collaboration are provided by earlier research and will be referred to. In addition, they are also provided by our findings as reported in Chapters 5 and 6. Based on these clues and the rationale as described above, the proposed extended professional identity theory has ten basic assumptions.

1. Social belonging is a common human need that predicts group commitment and group loyalty. People can feel committed to any social group under the right circumstances and have the tendency and desire to belong to a social group (Beal, Cohen, Burke & McLendon, 2003).
2. A group is a social psychological construct and thus a psychological reality. The perception that a collection of individuals is a psychological unity or group, also known as entitativity (Campbell, 1958), will depend on three aspects: common fate, similarity, and proximity. This is why new groups can be composed and accepted as a social psychological reality. Groups can also include smaller groups because people can have widening circles of group membership (Turner, 1987).

3. Social differentiation is essential for creating a strong professional identity. A social identity such as a professional identity is constructed by individuals through differentiation between groups as a result of intergroup comparison (Barnes et al., 2000; Forgas & Williams, 2014). This differentiation enables self-definition as a group member because individuals have a need for psychological distinctiveness. Psychological distinctiveness related to social identity formation is only possible when using a reference group (Turner & Reynolds, 2010).

4. Interprofessionalism cannot exist without distinct professional identities. When a professional identity has an interprofessional orientation, the uniqueness of one's own field of expertise becomes emphasized because interprofessional collaboration concerns connecting distinct fields of expertise. Thus, the uniqueness of a professional identity in an interprofessional team is related to the added value to the interprofessional team. When professional uniqueness decreases, so will the added value to the team. Team diversity is only utilized when there is interprofessional commitment. The relationship between team diversity and team effectiveness is moderated by team identity (Mitchell, Parker & Giles, 2011).

5. According to the team development model of Tuckman (1999, 1965), internal conflict or competition in a team is a risk after a team is formed. Introducing a comparable outgroup will shift the risk of internal competition to external competition. This way, interprofessional conflict or competition within a mixed profession group can be avoided and will not decrease group cohesion (Munkes & Diehl, 2003).

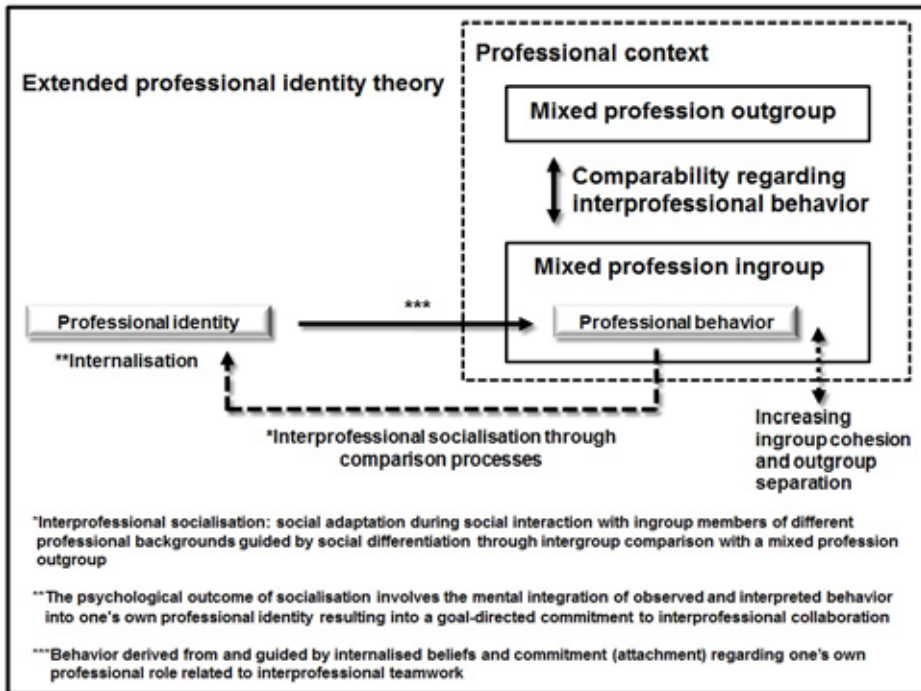
6. Only intergroup contact between members of different professions will enhance interprofessional tolerance but not change interprofessional positions. Attributions of professional characteristics can deviate from true group characteristics (Baker, Egan-Lee, Martimianakis & Reeves, 2011). Therefore, intergroup contact can enhance interprofessional tolerance through discrediting occupational stereotypes. However, it will not enhance interprofessional commitment because there is no sense of belonging to an interprofessional team that does not psychologically exist.

7. The nature of intergroup comparison dimensions will indirectly guide behavior through professional identity. A professional identity is a mental representation of professional behavior and, therefore, also interprofessional behavior. This identity subsequently guides professional and interprofessional behavior (Owens, Robinson & Smith-Lovin, 2010). When reciprocal behaviors (such as equal conversational turn-taking) between members of different professions are a comparison dimension or performance indicator, beliefs regarding interprofessional relationships will be altered through observational learning (Bandura, 1988) and social comparison (Festinger, 1954). This way, when such beliefs are developed in a work related context, they will become internalized and initiate interprofessional behaviors.

8. A professional identity with an interprofessional orientation is context dependent. A social identity is triggered by the context that is relevant to that identity (Finn, Garner & Sawdon, 2010; Ginsburg, Regehr & Lingard, 2003; Lingard, Garwood, Szauter & Stern, 2001). Interprofessional behavior does not always have to be necessary but is appropriate in dynamic situations and complex patient categories (Donofrio, Spohrer & Zadeh, 2010).
9. Intergroup comparison simultaneously enhances ingroup cohesion and outgroup separation. It is associated with intragroup cooperation (Böhm & Rockenbach, 2013), and outgroup derogation is often accompanied by ingroup favoritism (Hewstone, Rubin & Willis, 2002).
10. The group cohesion in a mixed profession group can increase through time without developing an interprofessional team culture. According to the team development model of Tuckman (1999, 1965), group cohesion will develop after a group has evolved beyond the storming phase. However, this model describes the development of any team and not just an interprofessional team. Thus, team cohesion is distinct from team culture.

Based on these ten basic assumptions, an extended professional identity is created when mixed profession groups are facilitated in comparing their interprofessional performance in a professional context (Fig. 1). The extended professional identity theory states that interprofessional collaboration can be enhanced by facilitating intergroup comparison on interprofessional reciprocity between mixed profession groups.

Figure 1.  
The extended professional identity theory



Interprofessional reciprocity is likely to be associated with a consequential interdependence because this reciprocity is applied as a comparative dimension or performance indicator. This way, interprofessional actions of members of different professions become relevant and manifest. For example, 'symmetrical communication' can only result from the appropriate contributions of all of the parties that are involved (Chapter 5). A couple of other examples that could function as performance indicators to enhance interprofessional self-definition might be 'mutual consult', 'inventorization of treatment interdependencies' to optimize care planning, 'enabling multiple patient entry points' to enhance efficient patient routing, 'sharing of clinical information' to reduce costs and enhance shared clinical decision-making, 'interprofessional task division' to enhance efficiency with a shared work load, and 'integrated patient-centeredness' as reported by patients. This way, interprofessional collaboration becomes more explicit and helps to define the interprofessional team as a new social identity. This social identity formation that will then be based on professional diversity is a necessity and inherent to being a competent professional and team member. Professional distinctiveness can then be perceived as an asset instead of a threat.



### 7.3 Integration of EPIT into a meta-model of interprofessional development







A professional identity with an interprofessional orientation is important for enhancing interprofessional collaboration; however, it is only one component of professional competence. It is a meta-competence that influences priorities and actions (Harrington & Hall, 2007). Thus, professional identity does not include competences with regard to discipline specific expertise, knowledge of other disciplines, or collaborative skills and procedures. Professional identity guides priorities and actions built on the available attitudes, knowledge, and skills that are required to function as a professional in a work related context. In order to fully comprehend the requirements that an individual needs for interprofessional collaboration, a model is needed to guide the development of a professional with his or her own expertise and uniprofessional identity as a starting point.

Many models and theories concerning interprofessional collaboration describe the competencies, characteristics, desired outcomes, or conditions that are required for interprofessional collaboration (e.g., Anderson & Lennox, 2009; Barr, 1998; WHO Working Group, 2010; Vyt, 2009). However, these models do not provide a practical incremental approach to interprofessional development. Furthermore, these types of models are also criticized for lacking 'conceptual clarity' (Carpenter & Dickinson, 2008). A recent model, DPIIM (Dual Professional and Interprofessional Identity Model), predicts that a combination of team and professional commitment will enhance interprofessional collaboration (Khalili et al., 2013). A study confirms the predictions of the DPIIM (Caricati et al., 2015). However, the DPIIM is a predictive model with general developmental phases for identity formation and is not an intervention model nor is it related to interprofessional development in general. The extended professional identity theory is meant to be an intervention theory and also does not include all of the requirements for interprofessional development. Therefore, this theory should be an element of an overarching model to clarify developmental steps. Therefore, a new model is proposed: a meta-model of interprofessional development. The purpose of this meta-model is to provide specific priorities for curriculum and team development beginning with an encounter between individuals with uniprofessional identities. An intrinsic motivated individual with an extended professional identity is the final phase of interprofessional development. In this context, both the extended professional identity theory and the meta-model of interprofessional development are complementary to the work of Khalili et al. (2013) and a logical follow up.

The meta-model of interprofessional development consists of several conditional requirements (phases) for interprofessional development numbered from 0 to 5 (Fig. 2). Each phase is semi-conditional to the next phase, has an increasing complexity because of a cumulative nature, and moves towards an increasing interprofessional self-regulation (intrinsically motivated interprofessionality). Even though phases are (semi-) conditional, they can overlap

and occur in a short amount of time, i.e., a couple of hours. However, investing more time in each phase will result in a more comprehensive development during a phase. The first three phases concern an orientation without connecting fields of expertise. The phases after these first three concern an instrumental and rational approach to connecting different fields of expertise ending with internal motivation to connect more than one expertise.

Figure 2.  
Meta-model of interprofessional development

Increasing complexity						
Increasing interprofessional self-regulation						
	Social	Content	Procedure	Environment	Identity	
Phase	0. 	1. 	2. 	3. 	4. 	5. 
Process	Private social acquaintance (private context)	Professional acquaintance (work context)	Orientation on added value of professional expertises	Establishing collaborative procedures	Interaction system and interprofessional behavior	Interprofessional positioning of professionals
↓	Who is that person?	Who is that professional?	Who can do what?	How do we do what together?	Why do we do what together?	What should I do because I am part of what we do?
Outcome	Attitudes towards a specific person	Attitudes towards a specific profession	Knowledge regarding other's scope of practice	Operational organization of interprofessional health care	Systemic influences on collaborative behavior	Interprofessional identification / T-shaped professional
Theory	Identity mobility (Ginsburg, Regehr & Lingard, 2003)		Professional role knowledge (McDonalds et al., 2010)	Sociotechnical system design (Long, 2013)		Extended professional identity theory
	Social identity theory (Tajfel & Turner, 1979)		Intergroup contact theory (Allport, 1954)	(Clinical) integrated care strategies (Kodner & Spreeuwenberg, 2002)	Hidden curriculum (Giroux & Penna, 1982)	
					Theory of instrumental collaboration (Gardner & Valentini, 2014)	

Phase 0 is a non-work related social orientation or acquaintance and will lead to a connection on a personal level but is not related to occupations or professional positions. Becoming familiar with someone will emphasize unique individual characteristics and make professional characteristics less prominent (Brewis, 2008). The outcome of this phase includes attitudes towards a specific person.

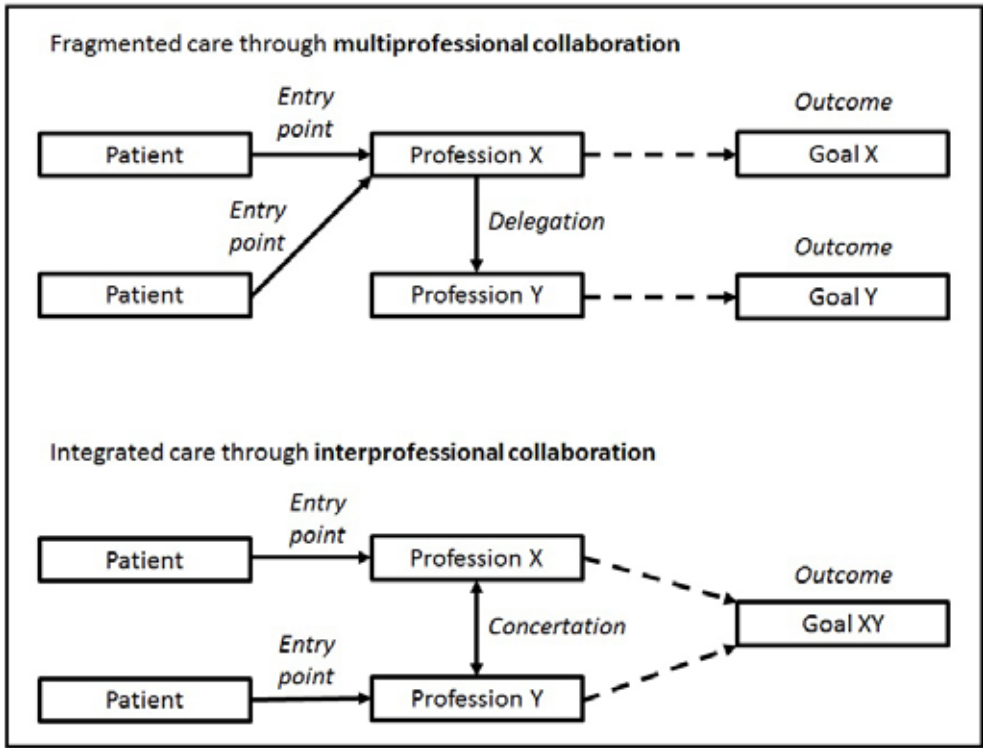
During Phase 1, the professional capacity emerges and the acquaintance will usually occur in a work related context. In contrast to personality, social identities are contextual and moderately stable (Ginsburg et al., 2003). Each context can trigger another social identity or several of them. Thus, context will activate a corresponding social identity or role identity which will

subsequently guide corresponding behavior. However, before this professional acquaintance takes place, occupational stereotypes can influence ingroup-outgroup behaviors and selective perceptions (Tajfel & Turner, 1979). Intergroup contact can dispel such stereotypes (Allport, 1954) which is why facilitating personal contact between members of different professions is one of the most popular strategies applied in interprofessional education (e.g., Carpenter & Dickinson, 2016; Khalili et al., 2013; Mohaupt et al., 2012; Hean & Dickinson, 2005). However, according to the proposed extended professional identity theory, mere intergroup contact between members of different professions will not enhance interprofessional commitment but only increase positive attitudes and interprofessional tolerance. The study of Chapter 5 provides some evidence for this assertion. Interprofessional contact in 'isolated' mixed profession groups will not change the relative professional positioning between different professions, and social commitment will remain uniprofessional.

In Phase 2, the professional orientation can become more comprehensive and the scope of practice and profession specific expertise can become clearer. This phase is conditional for the next phase since knowledge of professional roles makes it possible to assess the added value of a certain profession for patient centered care (Macdonald et al., 2010). Lack of knowledge regarding role or scope of practice can also contribute to assumptions regarding occupational competence or lack thereof when evaluating other professions. Therefore, orientation on professional content or other's scope of practice can also contribute to the discrediting of occupational stereotypes (Allport, 1954). Once professionals have a relatively clear view on the added value of other fields of expertise, interprofessional connections can be made.

Phase 3 consists of interprofessional procedures that facilitate interprofessional connections. This concerns information sharing, shared (clinical) consultation and decision-making, and shared care planning and evaluation. Therefore, skills related to team building and interprofessional collaboration are also inherent in this developmental phase. Shared procedures are the instrumental foundation of interprofessional collaboration. However, innovations are needed; new strategies must be developed to enable integrated care (Kodner & Spreeuwenberg, 2002; Stange, 2009). Thus far, the conventional health care system is especially focused on the coordination of different care paths by one leading profession instead of integrated connections between several professionals in a single care path (Stange, 2009). This is also the essential difference between multi- and interprofessional collaboration (Fig. 3). Even though these two concepts are often confused (Perreault & Careau, 2012), they are distinct constructs. Multiprofessional collaboration is more directed towards delegation from one (leading) profession to another and only concerns the involvement of different health professions. Interprofessional collaboration is directed towards concertation between health professions and concerns collaboration between health professions (Bachmann, Kiessling, Härtl & Haak, 2016).

Figure 3. Multiprofessional versus interprofessional collaboration



Thus, multiprofessional collaboration leads to the coordination of separate 'production lines' per patient each of which is the domain of a specific discipline with its own distinct goals. This way, the care of one patient becomes fragmented (Kodner & Spreuwenberg, 2002; Stange, 2009). Interprofessional collaboration emphasizes content related connections (concertation) between different fields of expertise. Naturally, this applies to the entire integrated care path of each patient whereby the patient routing begins with the point of entry. This also means that even the necessity of involving a certain discipline in a care process cannot be determined by just one profession. More than one profession should be able to be a point of entry to the health care system as long as they are competent and authorized to do so. Macey, Glenny, and Brocklehurst (2016) provide evidence that collaboration between dentists and dental hygienists can be advantageous to patients when dental hygienists also perform check-ups. This way, the health care system can be organized more efficiently. In this case, the responsibility for integrated care is the responsibility of any recognized profession. To address complex and multi-facet care problems, not one single discipline or professional can possess all of the knowledge needed to comprehensively shape an integrated care path of a specific and unique patient. Thus, delegation based on general assumptions about the expertise of

another discipline is, generally, not interprofessional but multiprofessional and can reduce quality of care. Even more so, fragmented care poses a threat to patient safety. Therefore, interprofessional collaboration is also perceived to be a way to enhance patient safety (Thistlethwaite, 2012; Tjia et al., 2009). The organizational structure of health care and the way professionals are trained mutually affect each other (Long, 2013) and sustain a fragmented care approach as long as these interacting factors mutually reinforce each other. This is the reason that new methods of working and training are required if we want to overcome the rising costs and future challenges of health care.

Phase 4 concerns the environment in which collaborative action takes place. Collaborative procedures can be obstructed or enabled by environmental factors. Thus, collaborative procedures, as part of the clinical and professional context, are imbedded in organizational and systemic environments. These environments play an important role in behavioral guidance and professional socialization. This distinction of different levels in the health care system are confirmed and described by several models: Person-centered Practice Framework (McCormack & McCance, 2011), The Bellagio Model (Schlette, Lisac, Wagner & Gensichen, 2009), Rainbow Model of Integrated Care (Valentijn, Schepman, Opheij & Bruijnzeels, 2013), and Development Model for Integrated Care (Minkman, 2012). This distinction helps us to understand the impact of the organizational and systemic environment on interprofessional collaboration in both educational and work settings. In the educational setting, the organizational and systemic factors are represented by influences of the 'hidden curriculum'. A hidden curriculum is a side effect of education that becomes visible in learned but unintended transmission of norms, values, and beliefs conveyed in the educational environment (Henry & Anthony, 1979). It reinforces existing social inequalities by educating students according to social position (Apple & King, 1983). Another educational influence is the impact of reward and feedback methods on individual and collective behavior. Similar to the hidden curriculum are the influences of organizational culture on relationships and communication between co-workers. In the work setting, organizational reward and feedback methods are not the only influence on the work climate. The organization itself must operate in an even larger and more complex system in which politics and policies, laws and regulations, and health insurance and remuneration methods impact work behaviors and professional priorities.

Phase 5 concerns the internalization of interprofessional belonging, interprofessional beliefs, and interprofessional commitment as a component of the professional identity. This is not the result of extrinsic motivators that derive from environmental influences but concerns an intrinsic motivation to work with other professionals and utilize more than just an individual's own field of expertise. This way, interprofessional commitment can guarantee interprofessional self-regulation without the need for continuous external reinforcement. In this phase, interprofessionality is internalized and becomes a natural element of a person's

professional identity and the professional competencies that are guided by this identity.

#### **7.4 Implications for education**

Both the meta-model of interprofessional development and the extended professional identity theory provide clues on how to facilitate and develop interprofessional collaboration in order to enable integrated care. This concerns the timing of interprofessional education, the important but limited value of conventional intergroup contact, the need for innovations with regard to interprofessional procedures, the impact of the hidden curriculum on interprofessional relationships, the importance of using reward and feedback to reinforce collective and not only individual behaviors, and the importance of implicit next to explicit learning related to professional identity formation.

##### ***7.4.1 Interprofessional education is not effective when introduced too early***

Interprofessional education (IPE) is important for dental hygienists for learning to become an equal professional team player, and dentists must become more aware of the professional boundaries of the dental hygienist's role (e.g., McComas & Inglehart, 2016; Moffat & Coates, 2011; Gillis & Parker, 1996; Knevel, Gussy, Farmer & Karimi, 2016; Muroga, Tsuruta & Morio, 2015; Pervez, Kinney, Gwozdek, Farrell & Inglehart, 2016). Therefore, both dental and dental hygiene students should first become familiar with their own profession so that they are able to communicate their added value to the interprofessional team. A clear professional identity must be developed prior to the development of an interprofessional identity. Interprofessional orientation complements a professional identity as an extension. The added value of different professions depends on their complementary and unique expertise. When this is ambiguous and underdeveloped, the professional identity will be substandard. This will subsequently weaken the professional position as a member of an interprofessional team or alliance. Therefore, when interprofessional education is introduced too early in the curriculum, students will have a difficult time expressing what can be expected of them and their profession (Barth, Godemann, Rieckmann & Stoltenberg, 2007). Moreover, first-year students hold perceptions that are more stereotypical compared to students with advanced training (Hammick, Freeth, Koppel, Reeves & Barr, 2007; Meirs et al., 2007). These strong occupational stereotypes do not always improve the outcomes of interprofessional education. In addition, mature-aged and experienced students appreciate interprofessional education more than younger students and are also more active participants during it. The debate regarding the optimal time to introduce it has not yet been resolved (Hall & Weaver, 2001). Current evidence shows that interprofessional education appears to be most effective when introduced vertically with progressive collaboration that is more advanced (McNair, Btown, Stone & Sims, 2001). This is also a consideration of the proposed meta-model of interprofessional development. Based

on the described phases of this meta-model, professional identity formation should first focus on clarifying its own uniqueness before becoming acquainted with members of other professions. Furthermore, the complexity of interprofessional development should increase during student training.

The first year of the dental and dental hygiene curriculum should be uniprofessional in order to acquire profession-specific knowledge and skills but also a clear sense of identity. The same social psychological processes on which the strategy of the proposed extended professional identity theory is based can also be used to enhance the formation of a clear professional identity. Before participating in interprofessional education, they should be fully aware of their added value in an interprofessional team or alliance and must be able to articulate this clearly without too much hesitation and indecision. Once students are well-acquainted with their own profession, they could show and teach students of other professions what their added value is. Such activities could be executed during multiprofessional education in which only knowledge of more than one scope of practice is shared and demonstrated among students. Multiprofessional education can involve attending the same lectures and learning about each other's scope of practice without true collaborative efforts. This can also help define an individual's own professional identity and further clarify professional distinctiveness related to other professions (Bridges, Davidson, Odegard, Maki & Tomkowiak, 2011). By using each other's profession as a reference, professional uniqueness and added value can be magnified and become clearer. The psychological need for distinctiveness will enhance professional uniqueness (Turner & Reynolds, 2010). Therefore, the effects of intergroup comparison on complementary characteristics and qualities shape the professional identity through interprofessional differentiation when dental and dental hygiene students meet but do not 'team up' (Forgas & Williams, 2014). Based on the arguments and evidence mentioned above, multiprofessional education is a valuable starting point for discrediting occupational stereotypes and for developing a discipline-specific professional identity through comparison and interprofessional differentiation. This strategy can precede interprofessional education in order to maximize distinctiveness as added value. A parallel but not isolated curriculum on profession-specific expertise may help to understand the unique side of an individual's own professional identity in combination with learning to collaborate (Kururi et al., 2017). Critical resources for a successful interprofessional curriculum are commitment from departments and colleges, curriculum development by an interprofessional team of staff members, diverse calendar agreements, curricular mapping, mentor and faculty training, a sense of community, adequate physical space, technology, and community relationships (Bridges et al., 2011).

#### ***7.4.2 The important but limited value of the conventional intergroup contact approach***

According to the findings of the experiment as described in Chapter 5, mere intergroup contact did not improve the behavioral equality that was displayed between the members of the different professions involved. However, conventional interprofessional education is

generally focused on 'isolated' mixed profession groups which are a social reality on their own. Relationships between the different professions within that group will not be changed but be mutually reinforced.

The results of the experiment described in Chapter 5 concerned an intervention to enhance interprofessional behavior. This behavior was operationalized as social equality or lack of interprofessional hierarchy. Such interprofessional behavior is inherent to interprofessional collaboration (D'Amour, Ferrada-Videla, San Martin Rodriguez & Beaulieu, 2005; Headrick, Wilcock & Batalden, 1998). Experimental results showed a decrease of interprofessional hierarchy reflected in social interaction between dental and dental hygiene students in a mixed profession group. However, the interprofessional hierarchy within the mixed profession groups in the control condition of this same experiment did not decrease. Interprofessional behavior did not change when dental and dental hygiene students were facilitated in getting know each other by learning and working together. This result deviates from current opinions on intergroup contact and its effect on interprofessional collaboration. It appears to be contradictory to the intergroup contact theory (Allport, 1954) which is one of the most popular theories used in contemporary interprofessional education (e.g., Carpenter & Dickinson, 2016; Khalili et al., 2013; Mohaupt et al., 2012; Hean & Dickinson, 2005). Therefore, just bringing groups of students together is not enough to promote interprofessional collaboration. Intergroup comparison processes between mixed profession groups should be facilitated in order to enhance not only positive attitudes but also interprofessional behavior. The experiments described in this dissertation were based on the idea that professional identity related to interprofessional collaboration can be changed through purposeful and systematic socialization in small groups and in a relatively brief period of time.

#### ***7.4.3 The need for innovations with regard to interprofessional procedures***

Students must also be able to design interprofessional procedures to facilitate effective and efficient interprofessional collaboration. This can deviate from conventional routines and requires an innovative use of modern technology (Kodner & Spreuwenberg, 2002; Stange, 2009). It also involves ideas on how to guarantee clear care paths, complaints procedures, the sharing of patient information, and screening or diagnosis. Instead of delivering and transferring 'correct' answers, as conventional education is accustomed to doing, students could also contribute to divergent processes in developing innovative integrated care procedures from their young, modern, and refreshing perspectives. Concertation does have to be limited to interprofessional collaboration alone.

#### ***7.4.4 The impact of the hidden curriculum on interprofessional relationships***

The environment in which interprofessional collaboration occurs contains antecedents that can enhance or obstruct interprofessional behavior. Therefore, the influence of role models must be explored and clues must be found on how to counterbalance or utilize those influences that



can limit or increase interprofessional collaboration in the educational setting (Lempp & Seale, 2004). Undesirable influences of the hidden curriculum can result in students' fears of personal inadequacy and making errors, students' feelings of being publicly belittled and subject to other forms of abuse, and students' prejudice against other professions (Benbassat, 2013). A hidden curriculum is a side effect of education that becomes visible in learned but unintended transmission of norms, values, and beliefs conveyed in the educational environment (Henry & Anthony, 1979). This side effect can also influence career choices and enhance performance in certain areas depending on the influence or role models (Stagg, Prideaux, Greenhill & Sweet, 2012). On the other hand, unintentional influence of faculty can be communicated through mixed and hidden messages with regard to professionalism (Hawick, Cleland, & Kitto, 2017). The formal and hidden curriculum can contradict one another and be evident in staff knowledge and behavior, required resources and available facilities, and lack of clear guidance regarding educating students in professionalism (Hawick, Cleland & Kitto, 2017).

Exploring the hidden curriculum can provide clues for changing the cultural climate by training faculty in the principles of interprofessional collaboration and integrated care. The impact of the hidden curriculum could also be reduced with teacher-independent education. For example, simulation-enhanced education with objective interprofessional performance-indicators might increase control over socialization processes.

#### ***7.4.6 The importance to use reward and feedback to reinforce collective behaviors***

Generally, conventional education is focused on the performance of individual students rather than the performance of groups of students (e.g., Bierer & Dannefer, 2016; Burk-Rafel, Santen & Purkiss, 2017; Domac, Anderson, O'Reilly & Smith, 2015). However, an assessment will determine the goal-directed study behavior of students. Therefore, individual assessments will direct individual behavior and not collective behavior. Educational programs should also have to apply collective rewards and feedback if collaborative behavior needs to be a desired outcome.

#### ***7.4.7 The importance of implicit next to explicit learning related to identity formation***

Conventional education is primarily focused on explicit learning instead of implicit learning. In contrast to explicit learning, implicit learning is learning without being aware of it (Frensch & Runger, 2003). Since education is expected to change student behavior in such a way that graduates are competent enough to work as a professional, anything that can positively contribute to this competence should be a relevant educational tool. Since professional identity is a meta-competence (Harrington & Hall, 2007) and professional identity formation consists of both explicit (conscious) and implicit (unconscious) learning processes (Pompper, 2014), education should also teach students by facilitating desired learning outcomes indirectly through the facilitation of psychological processes. Clues for how to indirectly facilitate student behavior through professional identity formation are provided by the extended professional identity theory and the evidence provided in Chapters 5 and 6.

## 7.5 Implications for clinical practice

The experiments of Chapters 5 and 6 demonstrate that interprofessional collaboration not only depends on predefined team objectives or rules of engagement. Behavioral and perceptual effects of these experiments are beyond mere reasoning. They are the results of active interventions influencing emotionally driven social behavior and team functioning. Therefore, the attitudes towards an extended scope of practice and independent practice as reported in Chapter 1 are also likely to reflect irrational and social psychological processes. The same applies for the communicated reasons for opposing or supporting an extended scope of practice as reported in the study of Chapter 2. Therefore, there are two simultaneous priorities of equal importance with regard to interprofessional collaboration and task shifting between dentists and dental hygienists: systemic change and operational change. Even when it is known how to meet all of the requirements to enable interprofessional care, we still depend on the influence of the environmental factors that affect our behavior. With regard to operational change, several implications can be mentioned: sharing a team practice or independent practices in close proximity, task shifting to dental hygienists can improve accessibility of oral health care, the incentives in and structure of the national assurance system should be adapted, new competences of dental hygienists should also be facilitated in practice, and the nature of task shifting should depend on its functionality to integrated care.

### *7.5.1 Sharing a team practice or independent practices in close proximity*

Interprofessional group formation or interprofessional commitment are more difficult when dentists and dental hygienists do not physically work together in close proximity. This indicates that a shared team practice or independent practices in very close proximity should be preferred. Proximity is an essential component of entitativity (the perception of being a group). In turn, entitativity is required for social commitment. When this group is a mixed profession group, commitment of individual group members to their mixed profession group can increase over time. When all team members are committed, the mixed profession group cohesion will increase. Competition with other similar groups can increase the chance this will happen. In turn, group cohesion is a predictor of team performance. When the mixed profession group is cultivated by making interprofessional behavior a performance indicator and when they can compare themselves with a similar mixed profession group, the group members are likely to collaborate interprofessionally with the members of their own mixed profession group. Finally, the mixed profession group will develop into an interprofessional team.

Studies regarding independent dental hygiene practice show no increased risk to patient safety (e.g., Astroth & Cross-Poline, 1998; Innes & Evans, 2013; Freed, Perry & Kushman, 1997). When dentists and dental hygienists share the same practice location, small groups will express more and stronger cohesion than large groups or individuals that work independently

from a distance. In large team practices, it will be wise to introduce several mixed profession groups between which interprofessional intergroup comparison is facilitated. In addition, interprofessional behavior should be rewarded and not just financially. Selfish and egocentric behaviors are potentially stimulated by only focusing on individual rewards and feedback. When applying the extended professional identity theory in clinical practice, mixed professions groups should be enabled to compare the interprofessional behavior and performance of other mixed groups or practices with their own mixed group or practice.

### ***7.5.2 Task shifting to dental hygienists can improve accessibility of oral health care***

Dental hygienists play an essential part in oral health care with regard to prevention (Thevissen, De Bruyn & Koole, 2016) and especially when diagnostic tasks are shared to enable clinical concertation. The dental hygienist could also, in collaboration with the dentist and other oral health care professionals, improve oral health care in additional ways such as performing additional dental tasks. Task shifting can be cost-effective (Beach, Shulman, Johns & Paas, 2007; Matthiesen, 2012), and dental hygienists who perform basic dental tasks can improve the accessibility of oral health care (Bell & Coplen, 2016; Myers, Gadbury-Amyot, VanNess & Mitchell, 2014).

### ***7.5.3 The incentives in and structure of the national assurance system should be adapted***

Several barriers limit task shifting to dental hygienists. Financial systems can negatively influence the dissemination of task shifting in oral health care (Brocklehurst et al., 2016; Coplen & Bell, 2015). This financial infrastructure, of which insurance companies are a part, is not always perceived by patients as being adequate (Edgington & Pimlott, 2000). In addition, to assure that dentists and dental hygienists do not pay too much attention to the needs of relatively healthy individuals, the delivery of dental care should be in accordance with the severity of the disease, and these oral health care providers should share views on diagnosis and treatment (Leisnert et al., 2015). The incentives in and structure of the national insurance system should be adapted to change these patterns.

### ***7.5.4 New competences of dental hygienists should also be facilitated in practice***

Besides the economics of oral health care, sustaining the competence of dentists and dental hygienists also remains of major importance. Just like dentists, dental hygienists should be facilitated in maintaining their competence through regular practice. Skills are acquired during undergraduate training and should be maintained after graduation. However, in practice, this opportunity is not always reality (Jerković-Ćosić et al., 2012; Northcott et al., 2013; Virtanen et al., 2011). In addition, task shifting can lead to polarization between professions like dentistry and dental hygiene (Adams, 2004; Knevel et al., 2016; Northcott et al., 2013; Ross & Turner, 2015). This polarization can subsequently lead to the underutilization of the dental hygienist (Knevel et al., 2016; Kreindler, Dowd, Dana Star & Gottschalk, 2012). Polarization between professions reflects social-political processes that also seem normal between other medical

professions, nursing, and allied health occupations (Macdonald, 1995).

Several studies report that patients trust in the competence of dental hygienists and their ability to function independently (e.g., Edgington & Pimlott, 2000; Innes & Evans, 2013; Phillips, Shaefer, Aksu & Lapidos, 2016; Turner & Ross, 2017). Many studies provide evidence that they are competent when performing specific dental tasks (e.g., Brocklehurst et al., 2012; Daniel & Kumar, 2016; DeAngelis & Goral, 2000; Macey et al., 2015; Post & Stoltenberg, 2014; Öhrn et al., 1996). Another study reports that dental hygienists are confident about their own competence and about working without dental supervision (Catlett, 2016). However, many patients are not well-informed about the role and qualifications of these individuals, and this makes it difficult for them to have a realistic opinion about task shifting (Brocklehurst et al., 2016; Pippi, Bagnato & Ottolenghi, 2017).

#### *7.5.5 The nature of task shifting should depend on its functionality to integrated care*

Inherent to interprofessional collaboration is professional autonomy (e.g., D'Amour et al., 2005; Headrick et al., 1998). Shifting tasks to dental hygienists not only concerns extending their scope of practice with or without certain dental supervision requirements (Johnson, 2009). The types of specific tasks shifted to the dental hygienist can vary per country, and specific dental tasks have distinct functions in oral health care. It is important to understand why certain dental tasks should be shifted to the dental hygienist and to what degree. Task shifting can have at least three different functions: intraprofessional (as an addition to profession-specific care), multiprofessional (coordination of shared case load), and interprofessional (for clinical concertation by shared diagnostic tasks). Local anesthesia for painful periodontal treatments and dental radiography to identify potential bone loss are examples of functional additions to the periodontal treatment by dental hygienists (Nield-Gehrig & Willmann, 2008). Cariologic diagnosis by dental hygienists can have different functions. Dental hygienists can discover caries when cleaning teeth and removing calculus. Dental radiography, initially used for periodontal diagnostic purposes, can sometimes show tooth decay before it becomes visible (Zadik & Bechor, 2008). Therefore, both dentists and dental hygienist can contribute to optimizing caries management with a multifunctional utilization of dental radiography. When used properly, this might improve oral health care efficiency. An effective sharing of dental radiographs and other diagnostic information between dentists and dental hygienists might also lower costs. Another function of cariologic diagnosis by the dental hygienist is not only to identify caries but also the degree of its complexity. Based on such an assessment, the dental hygienist could consult a dentist or refer to a dentist when the caries is overly complex and restorative procedures are not allowed to be performed by the dental hygienist. This way, the dental hygienist can focus on more common and less complex cariologic problems, share the case load with dentists, and make oral health care more accessible. When dentists and dental hygienists commit to an interprofessional practice in which they combine their added value, a dental hygiene diagnosis should also be conducted by the dentist. In that case, the

dentist should consult a dental hygienist and refer to that individual when the dental hygiene problem is too complex or the treatment is too extensive.

## 7.6 Concluding remarks

From an interprofessional perspective, task shifting is especially functional when it improves the care provided by a specific profession. However, when task shifting blurs the professional identity, it also reduces the added value of the separate disciplines involved in the team and does not do justice to their unique specialization. Because of increasing specialization, it becomes almost impossible for a single profession to be all encompassing. The interprofessional team members must overcome this problem by altering their perceptions and commitment regarding the position of their own profession towards other professions. Instead of becoming a generalist, they should remain a specialist in their own field of expertise but also discover ways to connect their expertise with other fields of expertise. Thus, professional distinctiveness represents added value which means that dentists and dental hygienists should become more distinctive but also more connected professions. This also means that task shifting, in particular dental restorative procedures, can distract dental hygiene students and professionals by focusing too much on dental tasks while neglecting their own expertise or core business. Specialists do not distinguish themselves by being overly versatile. They distinguish themselves because they are better at something compared to non-specialists. When dentists and dental hygienists are more distinct specialists, they will be more valuable to the interprofessional team as long as they are willing to combine their expertise.

Task shifting is an umbrella term that can apply to many different types of tasks with or without additional supervision requirements. This task shifting is not always a solution nor is it a goal. However, it can be a solution as long as interprofessional belonging, commitment, and beliefs are enhanced, and task shifting does not degenerate the distinctive features of professional identities. To improve health care, the focus should be on how we utilize expertise in general and how our own expertise is functionally related to other fields of expertise. Task shifting can be a tool to enhance an individual's own professional contributions and simultaneously be a tool to enable integrated health care through diagnostic overlap and mutual understanding. To do so, we must change the way we think, the way we do, and the way we feel. Even more so, good health care should be the result of what 'we' do together.

## References

- Adams, T. (1999). Dentistry and medical dominance. *Social Science & Medicine*, 48(3), 407-420.
- Adams, T.L. (2004). Inter-professional conflict and professionalization: dentistry and dental hygiene in Ontario. *Social Science & Medicine*, 58(11), 2243-2252. Allport, G.W. (1954). *The nature of prejudice*. Cambridge, MA: Perseus Books
- Alutto, J. A., Hrebiniak, L. G., Alonso, R.C. (1973). On operationalizing the concept of commitment. *Social Forces*, 51, 448-454.
- Anderson, E.S. & Lennox, A. (2009). The Leicester Model of Interprofessional education: developing, delivering and learning from student voices for 10 years. *Journal of Interprofessional Care*, 23(6), 557-573.
- Anderson, P., Beeley, J., Monteiro, P.M., De Soet, H., Andrian, S., Amaechi, B. & Huysmans, M.C. (2011). A European Core Curriculum in Cariology: the knowledge base. *European Journal of Dental Education*, 15(1), 18-22.
- Apple, M. & King, N. (1983). What Do Schools Teach? In Giroux, H. & David Purpel D. (Eds.), *The Hidden Curriculum and Moral Education*. (pp. 82-99), Berkeley, California: McCutchan Publishing Corporation.
- Aquino, K. & Douglas, S. (2003). Identity threat and antisocial behavior in organizations: The moderating effects of individual differences, aggressive modeling, and hierarchical status. *Organizational Behavior & Human Decision Processes*, 90(1), 195-208.
- Astroth, D.B. & Cross-Poline, G.N. (1998). Pilot study of six Colorado dental hygiene independent practices. *Journal of Dental Hygiene*, 72(1), 13-22.
- Bachmann, C., Kiessling, C., Härtl, A. & Haak R. (2016). Communication in Health Professions: A European consensus on inter- and multi-professional learning objectives in German. *GMS Journal of Medical Education*, 33(2), Doc23.
- Baker, L., Egan-Lee, E., Martimianakis, M. A., & Reeves, S. (2011). Relationships of power: implications for interprofessional education. *Journal of Interprofessional Care*, 25, 98-104.
- Bandura, A. (1988). Organizational Application of Social Cognitive Theory. *Australian Journal of Management*, 13 (2): 275-302.
- Barbour, J.B. Lammers, J.C. (2015) Measuring professional identity: a review of the literature and a multilevel confirmatory factor analysis of professional identity constructs. *Journal of Professions and Organization*, 2(1), 38-60.
- Barnes D, Carpenter J, Dickinson C (2000). Interprofessional education for community mental health: attitudes to community care and professional stereotypes. *Journal of interprofessional care*, 19, 565-583.
- Barth, M., Godemann, J., Rieckmann, M. & Stoltenberg, U. (2007). Developing key competencies for sustainable development in higher education. *International Journal of Sustainability in Higher Education*, 8 (4), 416-430.
- Barr, H. (1998). Competent to collaborate: Towards a competency based model for interprofessional education. *Journal of Interprofessional Care*, 12, 181-188.
- Barr, H. (2013). Towards a theoretical framework for interprofessional education. *Journal of Interprofessional Care*, 27, 4-9.

- Baxter, A.G. (1990). Commitment in cross-age tutoring: A study of motivational and emotional patterns underlying tutors' committed behavior. *Dissertation Abstracts International*.
- Beach, M.M., Shulman, J.D., Johns, G., Paas, J.C. (2007). Assessing the viability of the independent practice of dental hygiene--a brief communication. *Journal of Public Health Dentistry*, 67(4), 250-254.
- Beal, D. J., Cohen, R., Burke, M. J. & McLendon, C. L. (2003). Cohesion and performance in groups: A meta-analytic clarification of construct relation. *Journal of Applied Psychology*, 88 (6), 989–1004.
- Bell, K.P. & Coplen, A.E. (2016). Evaluating the Impact of Expanded Practice Dental Hygienists in Oregon: An Outcomes Assessment. *Journal of Dental Hygiene*, 90( 1), 33-41.
- Benbassat, J. (2013). Undesirable features of the medical learning environment: a narrative review of the literature. *Advances in health sciences education: theory and practice*, 18(3):527-536.
- Bierer, S.B. & Dannefer, E.F. (2016). The Learning Environment Counts: Longitudinal Qualitative Analysis of Study Strategies Adopted by First-Year Medical Students in a Competency-Based Educational Program. *Academic Medicine*, 91, S44-S52.
- Böhm, R. & Rockenbach B. (2013). The inter-group comparison-intra-group cooperation hypothesis: comparisons between groups increase efficiency in public goods provision. *PLoS One*, 8(2), e56152.
- Brewis, K. (2008). *Stress in the multi-ethnic customer contacts of the Finnish civil servants : developing critical pragmatic intercultural professionals*. Jyväskylä: University of Jyväskylä.
- Bridges, D. R., Davidson, R. A., Odegard, P. S., Maki, I. V., & Tomkowiak, J. (2011). Interprofessional collaboration: three best practice models of interprofessional education. *Medical Education Online*, 16, 10.3402/meo.v16i0.6035.
- Brocklehurst, P., Ashley, J., Walsh, T. & Tickle, M. (2012). Relative performance of different dental professional groups in screening for occlusal caries. *Community Dentistry & Oral Epidemiology*, 40(3), 239-246.
- Brocklehurst, P., Birch, S., McDonald, R., Hill, H., O'Malley, L., Macey, R. & Tickle, M. (2016). Determining the optimal model for role substitution in NHS dental services in the UK: a mixed-methods study. *Health Services and Delivery Research*, 4(22).
- Burk-Rafel, J., Santen, S.A. & Purkiss, J. (2017). Study Behaviors and USMLE Step 1 Performance: Implications of a Student Self-Directed Parallel Curriculum. *Academic Medicine*, 92, S67-S74.
- Calley, K.H., Bowen, D.M., Darby, M.L. & Miller, D.L. (1996). Factors influencing dental hygiene retention in private practice. *Journal of Dental Hygiene*, 70(4):151-60.
- Campbell, D. T. (1958). Common fate, similarity, and other indices of the status of aggregates of person as social entities. *Behavioural Science*, 3, 14–25.
- Caricati, L., Guberti, M., Borgognoni, P., Prandi, C., Spaggiari, I., Vezzani, E. & Iemmi M. (2015). The role of professional and team commitment in nurse-physician collaboration: A dual identity model perspective. *Journal of Interprofessional Care*, 29(5),464-468.

- Carpenter, J. & Dickinson, C. (2016). Understanding interprofessional education as an intergroup encounter: The use of contact theory in programme planning. *Journal of Interprofessional Care*, 30(1), 103-108.
- Carpenter, J. & Dickinson, H. (2008). *Interprofessional Education and Training*. Bristol: Policy Press.
- Catlett, A. (2016). Attitudes of Dental Hygienists towards Independent Practice and Professional Autonomy. *Journal of Dental Hygiene*, 90(4), 249-256.
- Cohen, A. (2003). *Multiple commitments in the workplace: An integrative approach*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Conley, S.N., Foley, R.W., Gorman, M.E., Denham, J. & Coleman, K. (2017). Acquisition of T-shaped expertise: an exploratory study. *Social Epistemology*, 31(2), 165-183.
- Coplen, A.E. & Bell, K.P. (2015). Barriers faced by expanded practice dental hygienists in Oregon. *Journal of Dental Hygiene*, 89(2), 91-100.
- D'Amour, D., Ferrada-Videla, M., San Martin Rodriguez, L., & Beaulieu, M.D. (2005). The conceptual basis for interprofessional collaboration: core concepts and theoretical frameworks. *Journal of Interprofessional Care*, 19(1), 116-131.
- Daniel, S.J. & Kumar, S. (2016). Comparison of dental hygienists and dentists: clinical and teledentistry identification of dental caries in children. *International Journal of Dental Hygiene*, [Epub ahead of print]
- Denmark, F.L. (2010). Prejudice and Discrimination. In I.R.Weiner, Irving B.; Craighead, W. Edward. *The Corsini Encyclopedia of Psychology* (pp. 1277), Vol.Three (4th ed.). Hoboken, N.J.: John Wiley.
- DeAngelis, S. & Goral, V. (2000). Utilization of local anesthesia by Arkansas dental hygienists, and dentists' delegation/satisfaction relative to this function. *Journal of Dental Hygiene*, 74(3), 196-204.
- Domac, S., Anderson, L., O'Reilly, M. & Smith, R. (2015). Assessing interprofessional competence using a prospective reflective portfolio. *Journal of Interprofessional Care*, 29(3):179-87.
- Donofrio, N., Spohrer, J., & Zadeh, H. S. (2010). driven medical education and practice: A case for T-shaped professionals. *MJA Viewpoint*.
- Dyble, G.L. (2012) "Going through the transition from being an end user to sort of the provider": making sense of becoming a mental health peer support worker using Interpretative Phenomenological Analysis. DCLinPsy thesis, University of Lincoln.
- Edgington, E. & Pimlott, J. (2000). Public attitudes of independent dental hygiene practice. *Journal of Dental Hygiene*, 74(4), 261-270.
- Evans, J.L., Henderson, A. & Johnson, N.W. (2012). Interprofessional learning enhances knowledge of roles but is less able to shift attitudes: a case study from dental education. *European Journal of Dental Education*, 16(4), 239-245.
- Finn, G., Garner, J. & Sawdon, M. (2010). 'You're judged all the time!' Students' views on professionalism: a multicentre study. *Medical Education*, 44(8), 814-825.
- Fiske, S.T. (1998). Stereotyping, Prejudice, and Discrimination. In Gilbert, D. T., Fiske, S. T., Lindzey, G. *The Handbook of*



- Social Psychology* (pp. 357). Vol. Two (4th ed.). Boston, Mass.: McGraw-Hill. p. 357.
- Festinger, L. (1954). A theory of social comparison processes. *Human relations*, 7(2), 117-140.
- Fontana, M., Guzmán-Armstrong, S., Schenkel, A.B., Allen, K.L., Featherstone, J., Goolsby, S., Kanjirath, P., Kolker, J., Martignon, S., Pitts, N., Schulte, A., Slayton, R.L., Young, D. & Wolff, M. (2016). Development of a Core Curriculum Framework in Cariology for U.S. Dental Schools. *Journal of Dental Education*, 80(6), 705-720.
- Forgas, J. P., Williams, K. D. (2014). *The social self: Cognitive, interpersonal and intergroup perspectives* (Vol. 4). Psychology Press.
- Freed, J.R., Perry, D.A. & Kushman, J.E. (1997). Aspects of quality of dental hygiene care in supervised and unsupervised practices. *Journal of Public Health Dentistry*, 57(2), 68-75.
- Frensch, P. A.; Runger, D. (2003). Implicit learning. *Current Directions in Psychological Science*, 12, 13-18.
- Gillis, M.V. & Praker, M.E. (1996). The professional socialization of dental hygienists: from dental auxiliary to professional colleague. *NDA Journal*, 47(1), 7-13.
- Ginsburg, S., Regehr, G. & Lingard, L. (2003). To be and not to be: the paradox of the emerging professional stance. *Medical Education*, 37(4), 350-357.
- Hall, P. & Weaver, L. (2001). Interdisciplinary education and teamwork: a long and winding road. *Medical Education*, 35(9), 867-875.
- Hamasaki, T., Kato, H., Kumagai, T. & Hagihara, A. (2017). Association Between Dentist-Dental Hygienist Communication and Dental Treatment Outcomes. *Health Community*, 32(3), 288-297.
- Hammerness, K., Darling-Hammond, L., & Bransford, J. (2005). How teachers learn and develop. In L. Darling-Hammond & J. Bransford, (Eds.), *Preparing teachers for a changing world: What teachers should learn and be able to do* (pp. 358 – 389). San Francisco, CA: Wiley & Sons.
- Hammick, M., Freeth, D., Koppel, I., Reeves, S. & Barr, H. (2007). Best evidence systematic review of interprofessional education: BEME Guide no. 9. *Medical Teacher*, 29(8), 735-751.
- Harrington, B. & Hall, D.T. (2007). *Career Management and Work-Life Integration: Using Self-Assessment to Navigate Contemporary Careers*. Los Angeles: Sage.
- Hawick, L., Cleland, J. & Kitto, S. (2017). Sending messages: How faculty influence professionalism teaching and learning. *Medical Teacher*, 39(9), 987-994.
- Headrick, L.A., Wilcock, M., & Batalden, B. (1998). Interprofessional working and continuing medical education. *British Medical Journal*, 316, 771-774.
- Hean, S & Dickinson, C. (2005). The Contact Hypothesis: an exploration of its further potential in interprofessional education. *Journal of Interprofessional Care*, 19(5), 480-491.
- Henry, A.G. & Anthony, N. (1979). *PennaSocial Education in the Classroom: The Dynamics of the Hidden Curriculum*.

*Theory & Research in Social Education*, 7(1), 21-42.

Hewstone, M., Rubin, M. & Willis, H. (2002). Intergroup Bias. *Annual Review of Psychology*, 53(1), 575-604.

Hogg, M.A., van Knippenberg, D., & Rast III, D.E. (2012). The social identity theory of leadership: Theoretical origins, research findings, and conceptual developments. *European Review of Social Psychology*, 23(1), 258-304.

Innes, N.P. & Evans, D.J. (2013). Evidence of improved access to dental care with direct access arrangements. *Evidence Based Dentistry*, 14(2), 36-37.

Jerković-Ćosić, K., Van Offenbeek, M.A. & Van der Schans, C.P. (2012). Job satisfaction and job content in Dutch dental hygienists. *International Journal of Dental Hygiene*, 10(3):155-162.

Johns, G.H, Gutmann, M.E., DeWald, J.P. & Nunn, M.E. (2001). Career retention in the dental hygiene workforce in Texas. *Journal of Dental Hygiene*, 75(2), 135-148.

Johnson, P.M. (2009). International profiles of dental hygiene 1987 to 2006: a 21-nation comparative study. *International Dental Journal*, 59(2), 63-77.

Kardos, S.M & Moore, S. (2007). On Their Own and Presumed Expert: New Teachers' Experience with Their Colleagues *Teachers College Record*,109(9) 2083-2106.

Khalili, H., Orchard, C., Spence Laschinger, H.K., & Farah, R. (2013). interprofessional socialization framework for developing an interprofessional identity among health professions students. *Journal of Interprofessional Care*, 27(6), 448-453.

Knevel, R., Gussy, M.G., Farmer, J. & Karimi, L. (2016). Perception of Nepalese dental hygiene and dentistry students towards the dental hygienists profession. *International Journal of Dental Hygiene*, [Epub ahead of print]

Klandermans, B. (2013). *Dual Identity. The Wiley-Blackwell Encyclopedia of Social and Political Movements*. The Wiley-Blackwell.

Kodner, D.L. & Spreuwenberg, C. (2002). Integrated care: meaning, logic, applications, and implications – a discussion paper. *International Journal of Integrated Care*, (2), 14.

Konzelmann, S., Yokom N. (1997). Internal Conflict in the Dental Industry: An Institutional Analysis. *International Contributions to Labour Studies*, 7(1), 81-95.

Kreindler, S.A., Dowd, D.A., Dana Star, N. & Gottschalk, T.(2012). Silos and social identity: the social identity approach as a framework for understanding and overcoming divisions in health care. *Milbank Quarterly*, 90(2), 347-374.

Kremer, L. & Hofman, J.E. (1985). Teachers' professional identity and burnout. *Research in Education*,34, 89-95.

Kururi, N., Tozato, F., Lee, B., Kazama, H., Katsuyama, S., Takahashi, M., Abe, Y., Matsui, H., Tokita, Y., Saitoh, T., Kanaizumi, S.,

Makino, T., Shinozaki, H., Yamaji, T. & Watanabe H. (2016). Professional identity acquisition process model in interprofessional education using structural equation modelling: 10-year initiative survey. *Journal of Interprofessional Care*,

30(2), 175-183.

Langendyk, V., Hegazi, I., Cowin, L., Johnson, M. & Wilson, I. (2015). Imagining alternative professional identities: reconfiguring professional boundaries between nursing students and medical students. *Academic Medicine*, 90(6), 732-737.

Lawler, E.J., Shane Thye, S., Yoon, J. (2008). Commitment in Structurally Enabled and Induced Exchange Relations. *Social Psychology Quarterly*, 69(2), 183-200.

Lee, K., Carswell, J.J. & Allen, N.J. (2000). A meta-analytic review of occupational commitment: relations with person- and work-related variables. *Journal of Applied Psychology*, 85(5), 799-811.

Leisnert, L., Axtelius, B., Johansson, V. & Wennerberg, A. (2015). Diagnoses and treatment proposals in periodontal treatment. A comparison between dentists, dental hygienists and undergraduate students. *Swedish Dental Journal*, 39(2), 87-97.

Leisnert, L., Karlsson, M., Franklin, I., Lindh, L. & Wretling, K. (2012). Improving teamwork between students from two professional programmes in dental education. *European Journal of Dental Education*, 16(1), 17-26.

Lempp, H. & Seale, C. (2004). The hidden curriculum in undergraduate medical education: qualitative study of medical students' perceptions of teaching. *British Medical Journal*, 329(7469), 770-773.

Lingard, L., Garwood, K., Szauter, K. & Stern, D. (2001). The rhetoric of rationalization: how students grapple with professional dilemmas. *Academic Medicine*, 76(10), S45-S47.

Linville, P. W., Salovey, P., & Fischer, G. W. (1986). Stereotyping and perceived distributions of social characteristics: An application to ingroup-outgroup perception. In J. F. Dovidio & S. L. Gaertner (Eds.), *Prejudice, discrimination, and racism* (pp. 165-208). San Diego, CA: Academic Press.

Long, S. (Ed.). (2013). *Socioanalytic methods: discovering the hidden in organisations and social systems*. Karnac Books.

Lymbery, M.E.F., Postle, K. (2007). *Social Work: A companion to learning*. London: Sage.

Macdonald, K.M. (1995). *The Sociology of the Professions*. London: Sage.

Macdonald, M.B., Bally, J.M., Ferguson, L.M., Lee Murray, B., Fowler-Kerry, S.E. & Anonson J.M. (2010). Knowledge of the professional role of others: a key interprofessional competency. *Nurse Education in Practice*, 10(4), 238-242.

Macey, R., Glenny, A.M. & Brocklehurst, P. (2016). Feasibility study: assessing the efficacy and social acceptability of using dental hygienist-therapists as front-line clinicians. *British Dental Journal*, 221(11), 717-721.

Macey, R., Glenny, A., Walsh, T., Tickle, M., Worthington, H., Ashley, J. & Brocklehurst, P. (2015). The efficacy of screening for common dental diseases by hygiene-therapists: a diagnostic test accuracy study. *Journal of Dental Research*, 94(3), 70S-78S.

Matthiesen, A. (2012). Economic feasibility of alternative practitioners for provision of dental care to the underserved. *Journal of the Californian Dental Association*, 40(1), 49-64.

McComas, M.J. & Inglehart, M.R. (2016). Dental, Dental Hygiene, and Graduate Students' and Faculty Perspectives

- on Dental Hygienists' Professional Role and the Potential Contribution of a Peer Teaching Program. *Journal of Dental Education*, 80(9), 1049-1061.
- McCormack, B., & McCance, T. (2011). *Person-centred nursing: theory and practice*. Oxford: Wiley & Blackwell.
- McNair R, Brown R, Stone N, Sims J. (2001). Rural interprofessional education: promoting teamwork in primary health care education and practice. *Australian Journal of Rural Health*, 9(1), S19-S26.
- McNeil, K.A., Mitchell, R.J. & Parker, V. (2014). Interprofessional practice and professional identity threat. *Health Sociology Review*, 22(3), 291-307.
- McNeil, K.A, Rebecca, J., Mitchell, R.J. & Parker V (2013). Interprofessional practice and professional identity threat. *Health Sociology Review*, 22(3), 291-307.
- Meirs, M., Clarke, B., Pollard, K., Rickaby, C., Thomas, J. & Turtle, A. (2007) Online interprofessional learning: The student experience. *Journal of Interprofessional Care*, 21(5), 529-542.
- Mikkelson H, Jourdenais R (2015). *The routledge handbook of interpreting*. London/New York: Routledge.
- Minkman, M.N. (2012). Developing integrated care. Towards a development model for integrated care. *International Journal of Integrated Care*, 12, e197.
- Mitchell, R., Parker, V. & Giles, M. (2011). When do interprofessional teams succeed? Investigating the moderating roles of team and professional identity in interprofessional effectiveness. *Human Relations*, 64(10), 1321-1343.
- Moffat, S. & Coates, D. (2011). Attitudes of New Zealand dentists, dental specialists and dental students towards employing dual-trained Oral Health graduates. *British Dental Journal*, 211(8), E16.
- Mohaupt, J., Van Soeren, M., Andrusyszyn, M.A., Macmillan, K., Devlin-Cop, S. & Reeves, S. (2012). Understanding interprofessional relationships by the use of contact theory. *Journal of Interprofessional Care*, 26(5), 370-375.
- Munkes, J & Diehl, M. (2003). Matching or Competition? Performance Comparison Processes in an Idea Generation Task. *GPIR*, 6(3), 305-320.
- Muroga, R., Tsuruta, J. & Morio I. (2015). Disparity in perception of the working condition of dental hygienists between dentists and dental hygiene students in Japan. *International Journal of Dental Hygiene*, 13(3), 213-221.
- Myers, J.B., Gadbury-Amyot, C.C., VanNess, C. & Mitchell, T.V. (2014). Perceptions of Kansas Extended Care Permit dental hygienists' impact on dental care. *Journal of Dental Hygiene*, 88(6), 364-372.
- Nascimento, M.M., Behar-Horenstein, L.S., Feng, X., Guzmán-Armstrong, S. & Fontana, M. (2017). Exploring How U.S. Dental Schools Teach Removal of Carious Tissues During Cavity Preparations. *Journal of Dental Education*, 81(1), 5-13.
- Nield-Gehrig, J.S & Willmann, D.E. (2008). *Foundations of Periodontics for the Dental Hygienist*. Philadelphia: Lippincott Williams & Wilkins.
- Northcott, A., Brocklehurst, P., Jerkovic-Cosic, K., Reinders, J.J., McDermott, I. & Tickle ,M. (2013). Direct access: lessons learnt from the Netherlands. *British Dental Journal*, 215(12), 607-610.

- Öhrn, K., Crossner, C.G., Börgesson, I. & Taube, A. (1996). Accuracy of dental hygienists in diagnosing dental decay. *Community Dentistry and Oral Epidemiology*, 24(3), 182–186.
- Omark, R.C. (1978). Training therapy of psychotherapists: professional socialization as interprofessional relations. *Psychological Reports*, 42, 1307-1310.
- Osborn, M. & Broadfoot, P. (1992). A Lesson in Progress? Primary Classrooms Observed in England and France. *Oxford Review of Education*, 18(1), 3-15.
- Owens, T.J., Robinson, D.T. & Smith-Lovin, L. (2010). Three Faces of Identity. *Annual Review of Sociology*, 36, 477–499.
- Perreault, K. & Careau, E. (2012). Interprofessional collaboration: one or multiple realities? *Journal of Interprofessional Care*, 26(4), 256-258.
- Pervez, A., Kinney, J.S., Gwozdek, A., Farrell, C.M. & Inglehart, M.R. (2016). Education About Dental Hygienists' Roles in Public Dental
- Prevention Programs: Dental and Dental Hygiene Students' and Faculty Members' and Dental Hygienists' Perspectives. *Journal of Dental Education*, 80(9), 1071-1081.
- Phillips, E., Shaefer, H.L., Aksu, M.N. & Lapidus, A. (2016). Is a mid-level dental provider model acceptable to potential patients? *Community Dentistry and Oral Epidemiology*, 44(5), 426-434.
- Pippi, R., Bagnato, F. & Ottolenghi, L. (2017). Oral Health Literacy: How much Italian people know about the dental hygienist. *Journal of Clinical and Experimental Dentistry*, 9(1), e13-e20.
- Pompper, D. (2014). *Practical and Theoretical Implications of Successfully Doing Difference in Organizations*. Bingley, UK: Emerald.
- Post, J.J. & Stoltenberg, J.L. (2014). Use of restorative procedures by allied dental health professionals in Minnesota. *Journal of the American Dental Association*, 145(10), 1044-1050.
- Reeves, S., Pelone, F., Harrison, R., Goldman, J., & Zwarenstein, M. (2017). Interprofessional collaboration to improve professional practice and healthcare outcomes. *Cochrane Database Systematic Reviews*, 6:CD000072.
- Reeves, S., Perrier, L., Goldman, J., Freeth, D. & Zwarenstein, M. (2013). Interprofessional education: effects on professional practice and healthcare outcomes (update). *Cochrane Database Systematic Reviews*, 28;(3):CD002213.
- Robbins, S.P. & Judge, T.A. (2013). *Organizational behavior*, Boston: Pearson.
- Ross, M. & Turner, S. (2015). Direct access in the UK: what do dentists really think? *British Dental Journal*, 218(11), 641-647.
- Schlette, S. Lisac, M., Wagner, E. & Gensichen, J. (2009). The bellagio model: An evidence-informed, international framework for population-oriented primary care. First experiences. *Zeitschrift für Evidenz, Fortbildung und Qualität im Gesundheitswesen*, 103(7), 467-474. *German*
- Schulte, A.G., Buchalla, W., Huysmans, M.C., Amaechi, B.T., Sampaio, F., Vougiouklakis, G. & Pitts, N.B. (2011). A survey on education in cariology for undergraduate dental students in Europe. *European Journal of Dental Education*, 15(1), 3-8.

- Schulte, A.G., Pitts, N.B., Huysmans, M.C., Splieth, C., Buchalla, W. (2011). European core curriculum in cariology for undergraduate dental students. *Caries Research*, 45(4), 336-345.
- Sibbald, B., Laurant, M. & Scott, A. (2006). Changing task profiles. In A. Saltman, A. Rico & W. Boerma (Eds.), *Primary Care in the Driver's Seat? Organizational Reform in European Primary Care* (pp 149-164). Maidenhead: Open University Press.
- Sibbald, B., Shen, J. & McBride, A. (2004). Changing the skill-mix of the health care workforce. *Journal of Health Services Research and Policy*, (9), 28-38.
- Stagg, P., Prideaux, D., Greenhill, J. & Sweet, L. (2012). Are medical students influenced by preceptors in making career choices, and if so how? A systematic review. *Rural Remote Health*, 12, 1832.
- Stange, K.C. (2009). The Problem of Fragmentation and the Need for Integrative Solutions. *Annals of Family Medicine*, 7(2), 100-103.
- Stets, J.E. & Burke, P.J. (2000). Identity Theory and Social Identity Theory. *Social Psychology Quarterly*, 63(3), 224-237.
- Stull, C.L. & Blue, C.M. (2016). Examining the influence of professional identity formation on the attitudes of students towards interprofessional collaboration. *Journal of Interprofessional Care*, 30(1), 90-96.
- Tajfel, H. & Turner, J. C. (1979). An integrative theory of intergroup conflict. In W. G. Austin & S. Worchel (Eds.). *The social psychology of intergroup relations* (pp. 33-47). Monterey, CA: Brooks/Cole.
- Tajfel, H. & Turner, J.C. (1986). The social identity theory of intergroup behavior. In S.Worchel & L.W. Austin (Eds.), *Psychology of Intergroup Relations* (pp.7-24). Nelson-Hall, Chicago.
- Thevissen, E., De Bruyn, H. & Koole, S. (2016). The provision of oral hygiene instructions and patient motivation in a dental care system without dental hygienists. *International Journal of Dental Hygiene*, [Epub ahead of print]
- Thistlethwaite, J. (2012). Interprofessional education: A review of context, learning and the research agenda. *Medical Education*, 46, 58-70.
- Tjia, J., Mazor, K.M., Field, T., Meterko, V., Spenard, A. & Gurwitz, J.H. (2009). Nurse-physician communication in the long-term care setting: perceived barriers and impact on patient safety. *Journal of Patient Safety*, 5(3), 145-152.
- Tuckman, B.W. (1965). Developmental sequence in small groups. *Psychological Bulletin*, 63, 384-399.
- Tuckman, B.W. (1999). *A tripartite model of motivation for achievement: Attitude/drive/strategy*. Paper presented at the annual meeting of the American Psychological Association, Boston.
- Turner, J. C. (1987). A Self-Categorization Theory. In Turner, J. C., Hogg, M. A., Oakes, P. J., Reicher, S. D. & Wetherell, M., S. (Eds.), *Rediscovering the Social Group: A Self-Categorization Theory* (pp. 42-67). Oxford, UK: Blackwell.
- Turner, J. C., Reynolds, K. J. (2010). The story of social identity. In T. Postmes & N. Branscombe. *Rediscovering Social Identity: Core Sources*. (pp. 13-32). New York: Psychology Press.
- Turner, S. & Ross, M. (2017). Direct access: how is it working? *British Dental Journal*, 222(3), 191-197.

Valentijn, P.P., Schepman, S.M., Ophrij, W., Bruijnzeels, M.A. (2013). Understanding integrated care: a comprehensive conceptual framework based on the integrative functions of primary care. *International Journal of Integrated Care*, 13:e010.

Virtanen, J.I., Tseveenjav, B., Wang, N.J. & Widström, E. (2011). Nordic dental hygienists' willingness to perform new treatment measures: barriers and facilitators they encounter. *Scandinavian Journal of Caring Sciences*, 25(2), 31131-6.

Vyt, A. (2009). *Exploring quality assurance for interprofessional education in health and social care*. Antwerpen-Apeldoorn: Garant.

Wackerhausen, S. (2009). Collaboration, professional identity and reflection across boundaries. *Journal of Interprofessional Care*, 23(5), 455-473.

WHO Working Group (2010). *Framework for action on interprofessional education and collaborative Practice*. Geneva:World Health Organisation.

Whittington, C. (2003). A model of collaboration. In: Weinstein, J., Whittington, C., Leiba, T. (Eds.). *Collaboration in Social Work Practice* (pp. 39-62). Londen: Jessica Kingsley.

Zadik, Y. & Bechor, R. (2008). Hidden occlusal caries: challenge for the dentist. *New York State Dental Journal*, 74(4), 46-50.





---

## Nederlandse samenvatting

---

## Samenvatting

Het doel van dit proefschrift betrof het verkennen van attitudes en afwegingen rond taakherschikking tussen tandartsen en mondhygiënist. Daarnaast werd nagegaan welke sociale kenmerken studenten toeschrijven aan elkaar, zichzelf en beide beroepsgroepen. Vervolgens werd het effect van een psychologische interventie in een onderwijssetting onderzocht op interprofessionele communicatie en percepties ten aanzien van interprofessionele taakverdeling. Tandartsen en mondhygiënist hebben verschillende attitudes ten opzichte van taakherschikking, vooral wat betreft de vrijgevestigde praktijk van mondhygiënist. Dit laatste wordt het minst gewenst door tandartsen. Tandartsen en mondhygiënist hebben verschillende afwegingen wanneer men een voor- of tegenstander is van dit beleid. De interprofessionele relatie tussen tandartsen en mondhygiënist komt tot uiting in de attributie van specifieke sociale kenmerken. Tandheekunde en mondzorgkunde studenten zijn beide de mening toegedaan dat tandartsen meer dominant zijn dan mondhygiënist. Het faciliteren van interprofessionele groepsvorming kan zowel interprofessionele hiërarchie als tandarts-gecentreerde taakverdeling reduceren.

Tijdens het eerste onderzoek (Hoofdstuk 2) werden verschillen tussen tandartsen en mondhygiënist ontdekt ten aanzien van de taakuitbreiding van de mondhygiënist. De helft van alle tandartsen en de meeste mondhygiënist hebben hierover een positieve attitude. Een interprofessionele kloof werd gevonden ten aanzien van de zelfstandige praktijkvoering van mondhygiënist. Een minderheid van alle tandartsen heeft hierover een positieve attitude vergeleken met een meerderheid van alle mondhygiënist. Dit suggereert dat de acceptatie van een zelfstandige mondhygiënist een groot obstakel is wanneer men taakherschikking wil implementeren. Tandartsen willen controle over de mondhygiënist behouden, daarom is het waarschijnlijk dat taakdelegatie boven taaksubstitutie wordt verkozen. Dit laatste betreft taakherschikking met professionele autonomie.

Uit het tweede onderzoek (Hoofdstuk 3) kwam naar voren dat flexibele samenwerking als een voordeel van taakherschikking wordt beschouwd. Daarom zou taakherschikking een strategie kunnen zijn om interprofessionele samenwerking te verbeteren. Dit zal meer succesvol zijn wanneer taakherschikking niet als een bedreiging wordt beschouwd en het de beroepsgroepen uit elkaar drijft.

De meeste afwegingen van mondhygiënist ten aanzien van taakherschikking zijn gerelateerd aan arbeidsinhoud en professionele identiteit. De 'nieuwe stijl' mondhygiënist, mondhygiënist met een taakuitbreiding, ervaren minder werktevredenheid wanneer zij het gevoel hebben minder autonomie te hebben. Zelfs wanneer mondhygiënist nieuwe behandeltaken willen uitvoeren, kan de traditionele methode van taakdelegatie voorkomen dat zij dit ook daadwerkelijk doen. Een gebrek aan autonomie kan een reden zijn om het werk

als mondhygiënist op te geven. Bovendien is taakvariatie geassocieerd met werktevredenheid. Behalve deze werktevredenheid gerelateerde factoren, rapporteren mondhygiënisten ook professionele identiteit als een reden om voorstander van taakherschikking te zijn. Voor tandartsen blijkt dit niet het geval. Het belang dat mondhygiënisten aan taakherschikking hechten zou verklaard kunnen worden door hun streven naar een volledige professionele status, hetgeen gebruikelijk is bij professionaliserende beroepsgroepen.

Uit deze studie volgt de constatering dat tandartsen en mondhygiënisten tegengestelde meningen hebben ten aanzien van kwaliteit van zorg. Veel mondhygiënisten beschouwen zichzelf competent, hoewel tandartsen deze perceptie niet delen als afweging om voorstander van taakherschikking te zijn. Dit zou verklaard kunnen worden door het gebrek aan kennis met betrekking tot de competentie van mondhygiënisten of dat zou voort kunnen komen uit andere motieven zoals het beschermen van economische belangen.

Uit het derde onderzoek (Hoofdstuk 4) kwam naar voren dat studenten tandheelkunde en mondzorgkunde dezelfde percepties delen ten aanzien van de sociale kenmerken van tandartsen. Tandartsen worden beschouwd als meer assertief en dominant vergeleken met mondhygiënisten, maar even respectvol. Dominantieverschillen worden door beide partijen erkend en worden doorgaans niet als een probleem ervaren. Tandheelkunde studenten beschouwen assertiviteit en dominantie, vergeleken met studenten mondzorgkunde, als iets meer onderscheidend ten aanzien van interprofessionele verschillen. Studenten tandheelkunde en mondzorgkunde identificeren zich vooral met de sociale eigenschappen van hun eigen professie.

Het vierde onderzoek (Hoofdstuk 5) had betrekking op de effectiviteit van een interventie om de sociale interactie tussen studenten tandheelkunde en mondzorgkunde te beïnvloeden. Deze beïnvloeding betrof psychologische groepsvorming gebaseerd op de principes van sociale identiteitsvorming. Individuen construeren een sociale identiteit door onderscheid te maken tussen hun eigen groep en een andere groep (intergroepsdifferentiatie). Dit onderscheidt versterkt daarmee de groepsidentiteit en onderlinge coöperatie. Daarom werd verwacht dat de vergelijking tussen gemengde groepen hiërarchisch gedrag binnen die groepen zou verminderen. In het bijzonder, tussen subgroepen van verschillende professies binnen dezelfde gemengde groep. De vergelijking had betrekking op wederkerige communicatie tussen die professionele subgroepen. Niet de identiteit die het gedrag stuurt, maar het gedrag zelf werd gemeten. Gedrag dat zou moeten worden voorspeld door de vorming van een nieuwe sociale of groepsidentiteit waarin wederkerigheid de primaire rol speelt. De verwachting werd deels bevestigd. Geen afdoende bewijs werd gevonden ten aanzien van een verandering in de professionele positie van de professies ten opzichte van elkaar, maar hiërarchie binnen de gemengde groepen werd wel door de interventie verminderd. Deze uitkomst is waardevol voor de kwaliteit van de mondzorg. Recent onderzoek toont

---

aan dat interprofessionele communicatie tussen tandartsen en mondhygiënisten invloed heeft op zorguitkomsten. Een opvallend resultaat van het onderhavig onderzoek was dat kennismaking door samenwerking (de controle groepen), de reguliere strategie binnen interprofessioneel onderwijs, geen invloed had op wederkerige communicatie tussen de professies binnen de gemengde groep.

In het vijfde onderzoek (Hoofdstuk 6) werd het effect van dezelfde interventie als uit het vierde onderzoek (Hoofdstuk 5) toegepast. Deze keer werd nagegaan welke invloed deze interventie had op waargenomen taakverdeling tussen tandartsen en mondhygiënisten. Deze interventie werd met studenten tandheelkunde en mondzorgkunde binnen een onderwijscontext uitgevoerd. Ook hier werd vergelijking tussen gemengde groepen gefaciliteerd. Deze vergelijking tussen gemengde groepen was gericht op wederkerige communicatie tussen de beide professies als subgroepen binnen een gemengde groep. Na het experiment werd de verdeling van de helft van alle tandheelkundige basistaken minder tandarts-gecentreerd. Vooral de percepties van studenten tandheelkunde werden door de interventie veranderd. Echter, interprofessionele taakverdeling ten aanzien van cariologische diagnostiek en cariologische behandeltaken waren na de interventie niet veranderd. Dit kan niet worden toegeschreven aan de perceptie dat mondhygiënisten minder competent zouden worden geacht of zichzelf minder competent zouden voelen. Bovendien toont onderzoek aan dat mondhygiënisten en studenten mondzorgkunde in staat zijn om cariës te diagnosticeren, te behandelen en restauratieve procedures uit te voeren.

Het is waarschijnlijk dat deze cariologische taken een speciale betekenis hebben voor studenten tandheelkunde en hun professie. Specifieke beroepstaken kunnen een symbolische waarde hebben die de ene professie van de andere onderscheidt. Immers, onderscheidend vermogen is de basis van professionele existentie. Dit wordt ook gereflecteerd in onderzoeken en beleidsstukken met betrekking tot curriculumontwikkeling rond cariologie. Deze richten zich alleen op tandheelkunde opleidingen en sluiten ‘tandheelkundige therapie’ en/of mondzorgkunde opleidingen uit. Dit suggereert dat cariologische taken te sterk geassocieerd worden met de professionele identiteit van tandartsen om hun percepties rond taakherschikking van deze taken te veranderen. Een herverdeling van deze taken lijkt meer waarschijnlijk wanneer tandartsen de ‘officiële eigenaar’ van dergelijke taken blijven of wanneer zij controle behouden over het delegeren van deze taken. Dit wordt vooral duidelijk doordat tandartsen restauratieve procedures naar Nederlandse tandartsassistenten delegeren. Vreemd genoeg, wanneer dergelijke taken naar tandartsassistenten worden gedelegeerd, blijkt competentie geen argument te zijn tegen de delegatie van dergelijke procedures. Nederlandse tandartsassistenten voeren restauratieve procedures uit terwijl ze beduidend minder training ontvangen dan ‘nieuwe stijl’ mondhygiënisten. Daarnaast kan men zich ook afvragen of elke tandheelkundige basistaak van tandartsen naar mondhygiënisten zou kunnen en moeten worden herverdeeld. Het is twijfelachtig of een team profiteert van het veranderen in een

homogeen collectief. Een team zonder diversiteit in expertise is een team dat minder effectief kan reageren op een dynamische omgeving.



---

Dankwoord

---

## Dankwoord

Allereerst wil ik mijn **begeleiders** bedanken voor hun adviezen, kritische kanttekeningen maar ook voor hun steun, vertrouwen en humor. Ik heb met veel plezier samengewerkt met Cees van der Schans, Boudewijn Stegenga en Wim Krijnen. **Cees**, bedankt voor al je tijd en wijsheid. Ik heb veel aan je adviezen en je relativerend vermogen gehad. Ik heb het zeer gewaardeerd dat je kritisch was maar mij ook de vrijheid gaf die ik nodig had om tot resultaten te komen. Hierdoor stelde je mij in staat om nieuwe ideeën te genereren. Veel dank daarvoor! Je bent een hartelijke man met humor en gevoel voor avontuur. Geweldig om te zien wat je allemaal onderneemt. Ook de avonturen met je zonen waar je zo trots op bent. De band tussen vader en zonen is mooi om te zien. Ik vind het ook geweldig dat ik na mijn promotie met jou en Wim kan blijven samenwerken. **Boudewijn**, met jou heb ik altijd een goed contact gehad. Je bent scherpzinnig en beschouwend. Onze expressie wijkt onderling opvallend af: ik ben duidelijk een expressieve extravert terwijl jij aanzienlijk minder woorden gebruikt dan ik. In de stiltes tussen andermans zinnen identificeer jij doeltreffend de essentie die je, vervolgens, minstens zo doeltreffend kan verwoorden. Vorig jaar nam voor jou een ongewenste en plotselinge wending. Sinds vorig jaar wordt je gezondheid bedreigd. Iets dat jou, Sabien en je kinderen compleet overviel. Mij en anderen ook. Je blijft echter een denker, een vechter voor je idealen en een man met een ijzersterk karakter. Ik gun jou en je familie alle geluk en gezondheid! **Wim**, je passie voor je vak is aanstekelijk. Je motiveerde mij om me meer te verdiepen in de statistiek. Ook mijn zoektocht naar normen en argumenten voor de interpretatie van diverse statische indices werd mede door jou gefaciliteerd en allerlei nieuwe technieken mocht ik mij eigen maken. We zijn regelmatig samen bezig geweest de data te doorgronden. Je hebt mij uitgedaagd zin en onzin van elkaar te onderscheiden en te twijfelen aan de juistheid en bruikbaarheid van uitkomsten maar ook van de statistische testen zelf. Zelfs de betrekkelijkheid van de traditionele focus op p-waarden, de onzinnige jacht naar significante resultaten, heb je mij bijgebracht. We hebben samen regelmatig gelachen om vervolgens weer om te schakelen en het kritisch werk te vervolgen. Heel erg bedankt voor alles!

Naast mijn promotiebegeleiders, wil ik ook al mijn **co-auteurs** bedanken voor hun waardevolle kennis, ideeën, adviezen en feedback. Een gemêleerd en interprofessioneel onderzoeksgeselschap bestaande uit mondhygiënist, tandartsen en psychologen: Katarina Jerković-Ćosić, Pieter Onclin, Merlijn Lycklama à Nijeholt, Aline Goldschmidt en Marjolein van Offenbeek.

In het bijzonder wil ik **Katarina Jerković-Ćosić** bedanken voor de leuke, interessante en intensieve samenwerking, onder andere met de University of Manchester. Bovendien is mijn proefschrift een vervolg op jouw proefschrift waarin jij al de noodzaak expliciteerde om aandacht te besteden aan de sociale en psychologische impact van taakherschikking.



Een onderwerp dat lange tijd onderbelicht bleef. In tussentijd ben je lector geworden aan de Hogeschool Utrecht met 'Innovaties in de preventieve zorg' als focus. Een welverdiende en relevante voortzetting van je onderzoekswerk.

Emeritus hoogleraar **Rob Schaub** wil ik bedanken voor zijn pionierswerk. Met grote zekerheid durf ik te beweren dat Rob Schaub wereldwijd de eerste was die interprofessioneel mondzorgonderwijs heeft geïntroduceerd. Dit stond bekend als het 'Groninger teamconcept'. Rob, mogelijk herinner jij je nog dat wij jaren geleden samen een lange autorit maakten. Tijdens die reis hebben wij het veel over onderzoek en over samenwerking binnen de mondzorg gehad. Jij gaf toen ook aan dat je het jammer vond dat promovendi tegenwoordig zelden een bijdrage leveren aan nieuwe theorievorming. Ik hoop dat ik, bij dezen, dan toch een dergelijke bijdrage heb kunnen leveren. Bedankt voor je inspiratie!

Alle **Nederlandse tandartsen en mondhygiënist** wil ik bedanken voor hun bijdragen aan mijn veldstudie. Ook de **KNMT** (Koninklijke Nederlandse Maatschappij tot bevordering der Tandheelkunde) en de **NVM** (Nederlandse Vereniging van Mondhygiënist) voor de mogelijkheid om onderzoek te kunnen uitvoeren onder hun leden. Ik hoop dat mijn resultaten voor hen mijn wederdienst kunnen zijn. Ook wil ik alle **studenten tandheelkunde en mondzorgkunde** bedanken voor hun bijdragen aan de experimentele studies. Van hen heb ik daarom ook veel kunnen leren en is het daardoor mogelijk geweest het interprofessioneel onderwijs door te ontwikkelen. Docendo discimus (Door te onderwijzen leren we zelf).

Het **management van het CTM** (Centrum voor Tandheelkunde en Mondzorgkunde) van het UMCG, **Luc van der Sluis** (hoofd CTM), **Anneke Bodewitz** (hoofd opleiding Mondzorgkunde, Hanzehogeschool), **Hans Schulten** (Manager Bedrijfsvoering) en **Henri Lohr** (Chef de Clinique) wil ik bedanken voor hun steun en vertrouwen. Het is erg fijn hoe zij zich willen inzetten voor innovatie binnen het onderwijs en de patiëntenzorg. Zij faciliteren ook toekomstig onderzoek en implementatie van interprofessionele samenwerking tussen tandheelkunde en mondzorgkunde. Met veel plezier zet ik mijn onderzoek als postdoc-onderzoeker voort binnen het UMCG-CTM. Ik verheug mij op dit interprofessioneel vervolg. Het MT van het CTM zet de toon voor integrale zorg door interprofessionele samenwerking. Hierdoor maken ze samenwerking een prioriteit voor het gehele CTM en met de partners daarbuiten.

**Mijn kamergenoten** binnen het CTM die ik tijdens mijn promotietraject heb gehad, wil ik bij dezen bedanken omdat zij vaak mijn sparringpartner wilden zijn. In het bijzonder mijn klinische kamergenoten die altijd bereid waren mijn kennishiaten rond klinische concepten en behandeling op te vullen. **Monique van Bruinisse** (met wie ik de voorliefde voor teckels kon delen en wiens gepassioneerde directheid ik altijd zeer heb gewaardeerd), **Dieuwke van der Honing** (die de trotse belichaming is van de 'Friese Vrijheid' en als geen ander een geëngageerde beschouwing kan stimuleren), **Daan van Welie** (die de andere 50% van

---

de mannenpopulatie binnen Mondzorgkunde vormt, humoristisch en constructief is en die bovendien met weinig middelen uitzonderlijk goede Aziatische noedels kan bereiden), **Klaarke Krakau de Jong** (ik waardeer onze serieuze gesprekken maar ook onze lol. Je bent iemand waar ik veel respect voor heb vanwege je warme persoonlijkheid en professionele gedrevenheid), **Anouk de Vries** (die sinds kort mijn kamergenoot is maar waarvan het mij nu al duidelijk is geworden dat zij een groot hart heeft voor haar vak, bruist van de energie en vol zit met ideeën).

**Tineke Buwalda** en **Teatske Wiesma** wil ik bedanken voor hun uitmuntende georganiseerdheid en ongedwongen gezelligheid. Je merkt pas echt wat je zelf aan kwaliteiten mist wanneer een ander er vele malen beter in is dan jijzelf. Ook daarom ben ik een sterk voorstander van interprofessionele samenwerking. Al is het ook uit pure noodzaak.

**Mijn collega's van het lectoraat** wil ik allemaal bedanken voor de fijne samenwerking. De onmisbare, professionele en sociale secretariële ondersteuning van **Judith van der Boom**, **Ineke van der Hoek**, **Ieneke van der Jagt** en **Trudy Hummel**. Alle overige lectoren, **Hans Hobbelen**, **Harriët Jager-Wittenaar**, **Margreet Luinge** en **Aly Waninge** wil ik ook bedanken omdat zij allen medeverantwoordelijk zijn voor het open, hardwerkende en sociale werkklimaat binnen de onderzoekersgemeenschap van de Academie van Gezondheidsstudies. Ook wil ik bedanken voor de interessante en inspirerende gesprekken die ik in een eerder stadium van mijn promotietraject heb gevoerd met de lectoren **Wolter Paans** en **Petrie Roodbol** van de Academie voor Verpleegkunde. Binnen de onderzoeksgemeenschap van het Wiebengacomplex heb ik een laagdrempelige en interprofessionele sfeer van hulpvaardige gelijkgezinden gevonden. Wat ook zo opvallend is, is hoe veel er gelachen wordt en hoe attent de medewerkers allemaal kunnen zijn. Mijn medepromovendi van het lectoraat, waarmee ik het grootste gedeelte van mijn traject heb gedeeld, wil ik bedanken voor hun collegialiteit, hulpvaardigheid, gezelligheid en humor. Zonder iemand te kort te willen doen, wil ik mijn dank uitspreken naar die promovendi waarmee ik het meeste contact heb gehad zoals **Renske van Abbema**, **Edwin van Adrichem**, **Lies ter Beek**, **Annemiek Bielderman**, **Priya Dewansingh**, **Rob Douma**, **Hans Drenth**, **Thea Kooiman**, **Rik Kranenburg**, **Caspar Mijlius**, **Willelme Nijholt**, **Gerlof Reckman**, **Martine Sealy**, **Astrid Tuinman** (promovenda verpleegkunde), **Margot Visser-Bochane**, **Boudina Visser**, **Linnet Weening-Verbree** en **Ellen de Wit**. Daarnaast wil ik ook **Justin Timmer** en **Renger Parker** noemen die weliswaar nooit als promovendi betrokken waren maar evengoed onderdeel uitmaken of uitmaakten van ons team. Alle andere onderzoekers en betrokkenen die ik niet bij naam heb genoemd, wil ik bedanken voor hun betrokkenheid zonder hen daarbij tekort te willen doen. Volledigheid en uitputtendheid zijn niet voor niets elkaars synoniem.

**Mijn collega's van tandheelkunde en mondzorgkunde** wil ik bedanken voor de prettige samenwerking en de hartelijke contacten. Ten aanzien van ontwikkelingen binnen het

interprofessioneel onderwijs wil ik in het bijzonder een paar collega's noemen die hebben bijgedragen aan de ontwikkeling van het interprofessioneel onderwijs binnen het CTM: **Heert Zijlstra** (tandarts), **Nynke Blanksma** (tandarts), **Rolf de Ruijter** (tandarts), **Marjan Worst** (mondhygiënist) en **Marian ten Bruggencate** (mondhygiënist). Ook heb ik veel gedachtewisselingen gehad met diverse collega's over hun vakgebied, de patiëntenzorg en samenwerking. Een paar collega's waar ik ook veel gesprekken en adviezen van heb gehad ten aanzien van samenwerking en de klinische praktijk zijn **Klaarke Krakau de Jong**, **Cecile Schiermeijer**, **Irene Scholten**, **Stella van Hoeve**, **William Wolters**, **Henri Lohr** en alle anderen die ik mogelijk (maar niet bewust) ben vergeten te noemen. Natuurlijk kan ik ook niet de fijne en reflectieve lunchwandelingen met **Betty Wildeboer** vergeten. Leuk dat we nog steeds contact hebben ook al stond dat tijdens mijn werkdrukke afgelopen tijd op een laag pitje. Het wordt weer eens tijd om te dansen! **Ulf Schepke**, die op 14 februari van dit jaar is gepromoveerd, wil ik bedanken voor zijn tips en gezelligheid rond de voorbereidingen voor de verdediging. Ik hoop dat ik ook nog iets aan jouw voorbereidingen heb kunnen bijdragen. Toch wel erg prettig wanneer je samen in hetzelfde schuitje zit. Ook erg leuk dat je wilde meewerken aan het ontwerp van de kaft van mijn proefschrift. Jouw spiegelbeeld staat er goed op!

Graag wil ik ook **Heleen Schuurman** (Onderwijsbureau mondzorgkunde) bedanken voor al haar goede zorgen rond de planning van het onderwijs en haar oprechte betrokkenheid bij de studenten. Bovendien heeft zij, net als ik, veel affiniteit met Engeland en dat is leuk om te kunnen delen. Ook goed voor het ophalen van mijn Engelstalige uitspraak trouwens. Ook wil ik alle mensen van het Curriculumbureau tandheelkunde, het Onderwijsinstituut bedanken voor de samenwerking. Voor het interprofessioneel onderwijs heb ik vooral samengewerkt met **Meta Gort**. Mijn dank gaat tevens uit naar alle collega's die betrokken zijn bij de (technische) ondersteuning van het onderwijs en de soms zeer complexe planning van onderwijsruimten. Met **Willem Deijs** heb ik ook jaren mogen samenwerken voor audiovisuele producties of het vastleggen van de samenwerkingsprocessen tijdens het interprofessioneel onderwijs. Je bent daarnaast trouwens ook een buitengewoon sympathieke gesprekspartner en ik hoop dat je nu met veel plezier van je pensioen geniet! Natuurlijk heb ik ook veel contact met mijn collega's van de ondersteuning en receptie van het Wiebengacomplex. Regelmatig kwam ik met vragen, haalde ik 's morgens de sleutel van het HAAL op, haalde ik 's middags de sleutel voor de 'oplader' op (alleen jullie begrijpen wat dit betekent) en bracht ik regelmatig 's avonds de sleutel van het HAAL weer terug. Zonder iemand tekort te willen doen wil ik in ieder geval de volgende mensen bedanken waar ik regelmatig contact mee heb gehad: **Gerbrand Stienstra**, **Joke van Os**, **Allister Grant**, **Monique Zuidema**, **Jan Poort**, **Jaap Helmus**, **Richard Schudde**, **Koen Kleve** en **Mario de Pauw**.

**Mijn collega's van fysiotherapie** wil ik bedanken voor hun interesse en leuke samenwerking. Een erg hecht team met een vakgebied dat interessant is om te leren kennen. Ook erg leuk om

---

sinds kort betrokken te zijn bij de ontwikkeling van een nieuw interprofessioneel programma geïnitieerd door **Jan Peter Landsman** (hoofd fysiotherapie) en **Sake van der Ploeg** (hoofd logopedie) waarin, naast fysiotherapie, ook **logopedie** en **voeding en diëtetiek** zijn betrokken ('Interprofessional Skills Day'). **Roos Dieleman** is daarvan niet alleen coördinator maar ook een zeer enthousiaste aanjager. Roos heeft mij geïnspireerd en mij van een aantal belangrijke zaken bewust gemaakt. Met name haar verhelderende onderscheid tussen 'expliciet leren' en 'impliciet leren'. Hierdoor werd ik mij bewust dat het onderwijs hoofdzakelijk gericht is op expliciet leren terwijl mijn interventie in feite impliciet leren faciliteert. Ook wil ik een aantal mensen noemen die betrokken zijn bij dit nieuwe interprofessionele programma maar waarmee ik soms ook daarbuiten erg fijn samenwerk en een leuk contact heb: **Sander Ensing** (fysiotherapie), **Jolanda van Lieshout** (fysiotherapie), **Jos Vloet** (fysiotherapie), **Sandra Jorna-Lakke** (fysiotherapie), **Aafke van der Schaaf** (logopedie), **Hilde Kwerreveld** (logopedie), **Marianne van Dijk** (voeding & diëtetiek) en **Andrea Werkman** (voeding & diëtetiek).

**Arwin Nimis**, de dean van de Academie voor Gezondheidsstudies van de Hanzehogeschool, wil ik bedanken voor het stimuleren van interprofessionele samenwerking tussen diverse opleidingen en beroepsgroepen binnen en buiten de school waar ik voor werk. Hij maakt daarmee integrale zorg een prioriteit en vervult daarmee een belangrijke sleutelrol in diverse nieuwe en innovatieve ontwikkelingen.

**Edwin van Keulen**, bedankt dat je mijn paranimf wilt zijn. Geweldig dat wij, na al die jaren, nog steeds contact hebben. Dit ondanks de afstand. En erg leuk dat we nog steeds onze interesses kunnen delen. Met name die voor geschiedenis. Je bent en blijft een goede vriend. Zelfs wanneer we elkaar een tijd niet hebben gezien, pakken we de draad met gemak weer op. Bij dezen wil ik je ook hartelijk bedanken voor de mooie foto's die jij voor dit proefschrift wilde maken. Je bent in mijn ogen een veelzijdige man, creatief, intellectueel en breed ontwikkeld. Dat is ook zo leuk aan jou. Ook hoe jij 'out of the box' kan denken. Wij gaan nog meer beleven!

**Nick Jonkhout**, bijzonder hoe wij elkaar hebben leren kennen. Nog specialer hoe onze band werd versterkt door persoonlijke omstandigheden. Zoals ik je heb laten weten: "Wanneer je mij nodig hebt, weet je mij te vinden". Ik hoop dat je dat doet. Niet voor niets vroeg ik jou daarom om mijn paranimf en dus secondant te worden. Nog logischer omdat je ook sterk betrokken was bij mijn onderzoek en zelfs meehielp met de dataverwerking van mijn veldstudie. Je bent nu, jaren later, de man van Anje en vader van Arne. Prachtig! 'Een echte vriend wordt in onzekere tijden opgemerkt'.

**Simon van Exter**, wanneer ik een derde paranimf zou mogen kiezen, dan was jij dat geworden. Wij zijn al bevriend sinds wij beiden psychologie studeerden en die vriendschap is nog even sterk. Waarschijnlijk zelfs sterker. Met jou is er aan diepgang geen gebrek. Tot het

ochtendgluren kunnen wij praten. Helaas kan jij beter tegen slaapttekort dan ik. Je bent altijd betrokken geweest bij mijn onderzoek en erg attent. Bedankt vriend! Gelukkig is er “geen limiet op goede vrienden”.

**Mijn ouders** wil ik graag bedanken omdat hun levenshouding en wijze lessen me hebben gebracht waar ik nu ben. ‘Liefde is gunnen’ heb ik van jullie geleerd. Omdat je eigen geluk niet onafhankelijk is van het geluk van anderen. Of dat je respect moet tonen zonder jezelf te verloochenen. Je moet trots zijn op wie je bent en hoe je je onderscheidt. Tot slot, dat je veel kan bereiken als je dat echt wilt. Jullie hebben daarmee mijn ontwikkeling altijd gestimuleerd, zijn kritisch geweest en hebben mij vrij gelaten in mijn keuzes. De focus op studiediscipline en ontwikkeling werd altijd geïllustreerd door jullie gevleugelde uitspraken: “De studie gaat voor het meisje.” en “Je hebt een maarschalksstaf in je ransel!” Toen tijdens mijn promotietraject mijn wereld volledig in elkaar dreigde te storten, stonden jullie onvoorwaardelijk voor mij klaar. Zoals jullie altijd hebben gedaan. Van Zeeland tot Groningen. Luctor et emergo (ik worstel en kom boven), maar niet zonder jullie hulp! Bedankt lieve ouders!

**Tristan en Arvid**, papa is heel trots op jullie en ook heel trots dat ik jullie papa mag zijn. Hoewel jullie beiden hele verschillende jongens zijn, zijn jullie ook elkaars beste vrienden. En ruzie? Dat heeft iedereen wel eens. Samen kunnen jullie geweldig leuk spelen en jullie laten regelmatig blijken dat jullie elkaar erg lief vinden. Dat vind ik als papa heel fijn om te zien. Ik geniet van jullie verwondering en hoop dat jullie met dezelfde leergierigheid en bewondering naar de wereld blijven kijken. Soms spreken jullie een gedachte hardop uit en betrap ik jullie op prachtige wijsheden. Tristan vraagt zich regelmatig dingen af en probeert te begrijpen hoe de wereld in elkaar zit: “Alles wat kan, is al eens gebeurd”. Arvid constateert het onvermijdelijke: “Morgen moet nog beginnen”. Jullie houden beiden van avontuur. Tristan wil onderzoeker worden. Liefst paleontoloog, archeoloog en/of geoloog. Ook wil jij ooit in China op zoek gaan naar botten van dinosauriërs. Arvid zou spion willen worden of uitvinder van gadgets (‘gadget-man’). Die voorliefde voor technische snufjes en bijzondere apparaten herken ik. Dat heb ik weer van mijn vader, jouw Grote Opa, geërfd. Maar ook onderzoeker zijn lijkt jou wel wat. Dan wel een archeoloog. Want overal kunnen er nog kostbaarheden en bijzondere dingen in de grond liggen of in oude gebouwen worden ontdekt. Ook zijn jullie beiden sportief. Dat is goed want dat is heel gezond. Jullie spelen elk in jullie eigen voetbalteam en worden beiden steeds beter. En wanneer je een wedstrijd verliest, is dat niet erg hoor. Het gaat om het spelplezier. Jullie zijn de liefste en mooiste kinderen die een papa zich zou kunnen wensen en ik wens jullie heel veel geluk bij alles wat jullie nog gaan beleven. De wereld ligt voor jullie open!

**Hendriq**, mijn lieve vrouw. Ik had nooit gedacht dat ik ooit weer zou trouwen totdat ik jou ontmoette. Wat voor jou op het landgoed Dartington als een totale verrassing kwam, was al maanden gepland. De Engelse tuin van het landgoed was de juiste locatie. En mijn vraag aan

---

de juiste vrouw. Die zonnige dag in het zuidelijke Devon zal ik nooit meer vergeten. 'You do something to me that I can't explain'. Ook onze bruiloft in Groningen, afgelopen jaar, was 'a perfect day'. Ik ben trots dat ik je mijn vrouw mag noemen. Je hebt mij in de laatste fase van mijn promotietraject enorm gesteund. Ik wil je daar nadrukkelijk voor bedanken. Het is heel fijn om met jou van gedachten te wisselen want je bent een intelligente vrouw met een brede algemene ontwikkeling. Ik leer veel van je en ook dat is een verrijking. Daarnaast heb je veel humor en dat vind ik erg aantrekkelijk aan een vrouw. Als vader is het voor mij geweldig hoe lief jij voor Tristan en Arvid bent en ik weet dat zij ook zeer op jou gesteld zijn. Je bent een lot uit de loterij! Ik zal nu stoppen met mijn gezwijmel want dat gaat te ver voor een dankwoord in een proefschrift. Zodra ik meer tijd heb, kan je ongetwijfeld weer poëzie van mij verwachten...







---

## Curriculum Vitae

---

Jan Jaap Reinders werd op 4 november 1972 geboren te Rotterdam als de zoon van Josephus Jacobus Reinders en Dienke Reinders-Benes. In zijn jeugd heeft hij in diverse Nederlandse plaatsen gewoond binnen de provincies Zeeland, Zuid-Holland, Noord-Holland, Friesland en Groningen. In Leeuwarden is hij opgeleid tot theaterdocent, waarna hij een half jaar les heeft gegeven aan Dartington College of arts in Devon, Engeland. Daarna heeft hij zijn studie psychologie aan de Rijksuniversiteit Groningen gecombineerd met een aantal betaalde regie- en acteerprojecten. In 2000 studeerde hij af als Arbeids-, Organisatie- en Personeelspsycholoog met de nevenrichting Sociale Psychologie. Vervolgens is hij jaren werkzaam geweest binnen het Onderwijsinstituut van de Faculteit der Medische Wetenschappen. Daar gaf hij onderwijsadvies rond toetsing, voerde hij uiteenlopende onderzoeken uit en coördineerde hij het werk van onderzoeksinterviewers voor een longitudinaal onderzoek naar het loopbaangedrag van Groningse artsen.

Uiteindelijk is Jan Jaap als docent en onderzoeker gaan werken binnen de opleidingen Tandheelkunde (Rijksuniversiteit Groningen) en Mondzorgkunde (Hanzehogeschool Groningen), die onderdeel zijn van het samenwerkingsverband: CTM (Centrum voor Tandheelkunde en Mondzorgkunde). CTM is tevens een afdeling van het Universitair Medisch Centrum Groningen (UMCG). Jan Jaap heeft binnen CTM een interprofessioneel onderwijsprogramma ontwikkeld en coördineert dit programma sindsdien. Zijn promotieonderzoek heeft hij ook binnen het CTM uitgevoerd, waar hij nog steeds werkzaam is. Tegelijkertijd werkt hij ook al een aantal jaar binnen de opleiding Fysiotherapie van de Hanzehogeschool Groningen. Daar geeft hij onderwijs rond gedrag en communicatie zoals motivational interviewing en anamnesetraining. Sinds kort is hij tevens betrokken bij de ontwikkeling van een nieuw interprofessioneel onderwijsprogramma voor de opleidingen Fysiotherapie, Logopedie en Voeding en Diëtetiek. Deze opleidingen zijn, net als Mondzorgkunde, onderdeel van de Academie voor Gezondheidsstudies, Hanzehogeschool Groningen. Na de afronding van zijn promotieonderzoek zet hij zijn onderzoek voort naar het bevorderen van interprofessionele samenwerking en onderwijs binnen Hanzehogeschool, Rijksuniversiteit Groningen en UMCG.

### Overige publicaties rond taakherschikking, interprofessionele samenwerking en onderwijs

**Reinders, J.J.** (2015). De psychologie van het dreamteam. Hints voor het managen van 'uw team'. *Tandartspraktijk*, 18-22.

Hobbelen, H., **Reinders, J.J.**, Alfenaar, K., van Gastel, W., ten Haaf, G. & van Leeuwen. (2015). Agenda praktijkgericht onderzoek health. Topsector Life Sciences & Health.

**Reinders, J.J.** (2014). Interprofessionele samenwerking tussen tandarts en mondhygiënist in de mondzorgpraktijk. In: J.K.M. Aps, H.S. Brand, M.De Bruyne, R.J.J. van Es, R. Jacobs & A. Vissink (Eds.) *Het Tandheelkundig Jaar 2015*. (pp. 129-138), Houten: Bohn Stafleu van Loghum

Northcott, A., Brocklehurst, P., Jerković-Ćosić, K., **Reinders, J.J.**, McDermott, I. & Tickle, M. (2013). Direct access: lessons learnt from the Netherlands. *British Dental Journal* 215, 607 - 610.

**Reinders, J.J.**, Van der Schans, CP, Stegenga B (2013). Effects of the Interprofessional Work Simulation on reducing status-inequality. Collaborating Across Borders IV (CAB IV). Transformative Change from the Classroom to Practice. Vancouver, BC, Canada. *Peer Reviewed Abstract Booklet*, 56-57.

**Reinders, J.J.**, Onclin, P., Van der Schans, C.P. & Stegenga, B. (2012). How attitudes of dentists and dental hygienists towards task redistribution are related to gender: a review. Proceedings of the 30th International Congress of Psychology, Cape Town, South Africa. *International Journal of Psychology*, 47: 517.

**Reinders, J.J.** & Blanksma, N.G. (2012). [The collaboration between dentists and dental hygienists: from paradox to resolution]. *Nederlands Tijdschrift voor Tandheekunde*, 119: 317-322.





---

## SHARE and previous dissertations

---

## **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 internet site: <http://www.share.umcg.nl/>

More recent theses can be found in the list below.  
((co-) supervisors are between brackets)

**2017**

### **Hoeve Y ten**

From student nurse to nurse professional

*(prof PF Roodbol, prof S Castelein, dr GJ Jansen, dr ES Kunnen)*

### **Ciere Y**

Living with chronic headache

*(prof R Sanderman, dr A Visser, dr J Fleer)*

### **Borkulo CD van**

Symptom network models in depression research; from methodological exploration to clinical application

*(prof R Schoevers, prof D Borsboom, dr L Boschloo, dr LJ Waldorp)*

### **Schans J van der**

ADHD and atopic diseases; pharmacoepidemiological studies

*(prof E Hak, prof PJ Hoekstra, dr TW de Vries)*

### **Berhe DF**

Challenges in using cardiovascular medications in Sub-Saharan Africa

*(prof FM Haaijer-Ruskamp, prof K Taxis, dr PGM Mol)*

### **Heininga VE**

The happy, the sad, and the anhedonic; towards understanding altered reward function from a micro-level perspective

*(prof AJ Oldehinkel, dr E Nederhof, dr GH van Roekel)*

**Oers AM van**

Lifestyle intervention in obese infertile women

*(prof A Hoek, prof BWJ de Mol, dr H Groen)*

**Magnée T**

Mental health care in general practice in the context of a system reform

*(prof PFM Verhaak, prof FG Schellevis, prof DH de Bakker, dr DP de Beurs)*

**Zon SKR van**

Socioeconomic inequalities in work and health

*(prof SA Reijneveld, prof U Bültmann)*

**Most PJ van der**

Development of bioinformatic tools and application of novel statistical methods in genome-wide analysis

*(prof H Snieder, Prof P van der Harst, dr IM Nolte)*

**Fleurke-Rozema H**

Impact of the 20-week scan

*(prof CM Bilardo, prof E Pajkrt, dr RJM Snijders)*

**Schripsema NR**

Medical students selection; effects of different admissions processes

*(prof J Cohen-Schotanus, prof JCC Borleffs, dr AM van Trigt)*

**Ven HA van de**

Shift your work; towards sustainable employability by implementing new shift systems

*(prof JJJ van der Klink, prof MP de Looze, prof U Bültmann, prof S Brouwer)*

**Hoekstra F**

ReSpAct: Rehabilitation, sports and active lifestyle

*(prof LHV van der Woude, prof CP van der Schans, dr R Dekker, dr FJ Hettinga)*

**De Carvalho Honorato T**

Diminished ovarian reserve and adverse reproductive outcomes

*(prof A Hoek, prof HM Boezen, dr H Groen, dr ML Haadsma)*

**Olthof M**

Patient characteristics related to health care consumption; towards a differenti-

---

ated capitation model

*(prof SK Bulstra, prof MY Berger, dr I van den Akker-Scheek, dr M Stevens)*

**Bessem B**

The young athlete's heart; an electrocardiographic challenge

*(prof J Zwerver, prof MP van den Berg, dr W Nieuwland)*

**Husarova D**

Barriers to active participation of school-aged children

*(prof SA Reijneveld, prof A Madarasova-Geckova, dr JP van Dijk)*

For more 2017 and earlier theses visit our website







Research Institute  
**SHARE**