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Task shifting, interprofessional collaboration and education in oral health care

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CHAPTER 5

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

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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.

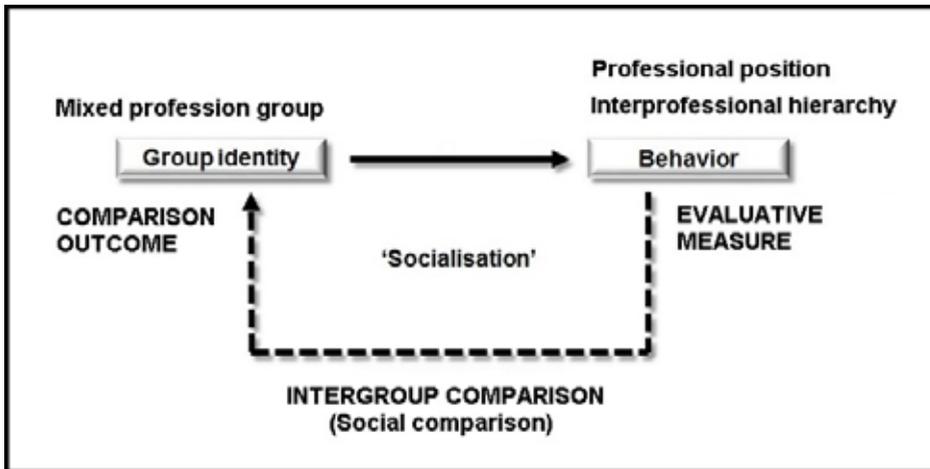
Intergroup comparison can enhance intragroup collaboration (Böhm & Rockenbach, 2013) because it enhances social identification. This identification is associated with perceived intragroup similarity through psychological distinctiveness from another group (Tajfel & Turner, 1979). Such intragroup similarity 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.

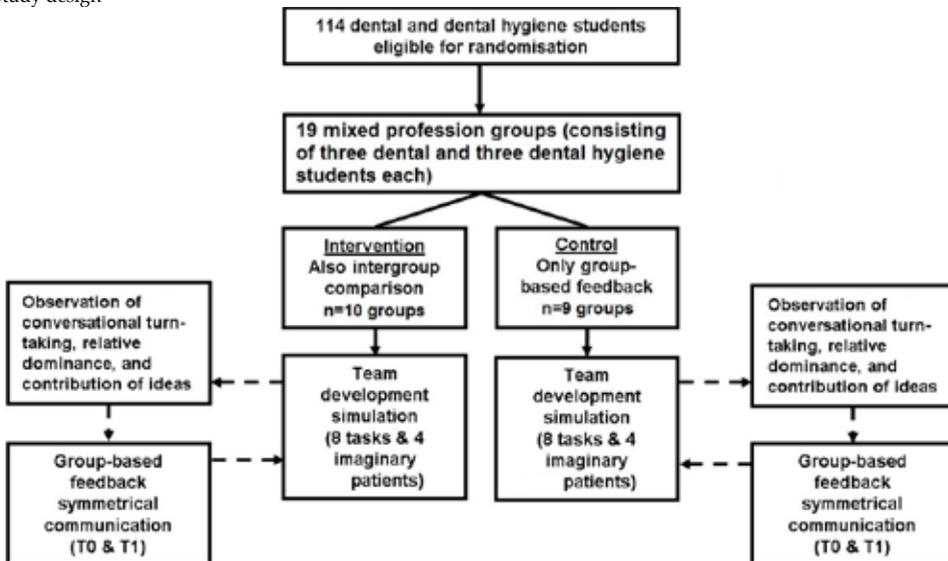
Participants

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

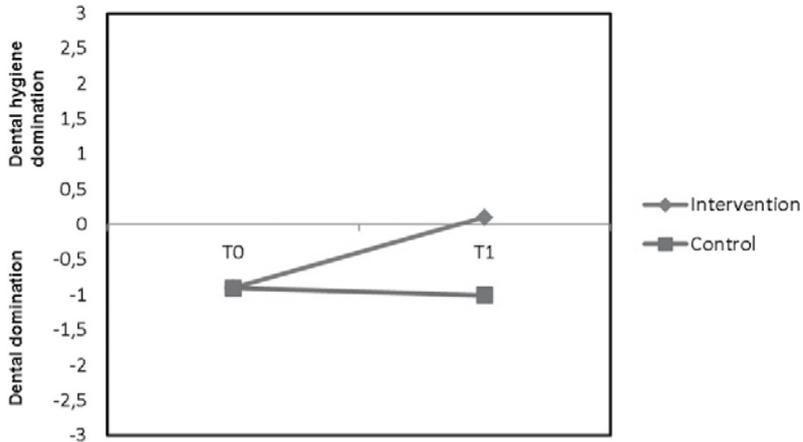
Time=Professional position at T0 and T1; Cond.=Experimental condition (intervention versus control); Time*Cond.=interaction between Time and Experimental condition. 95% Confidence Interval

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

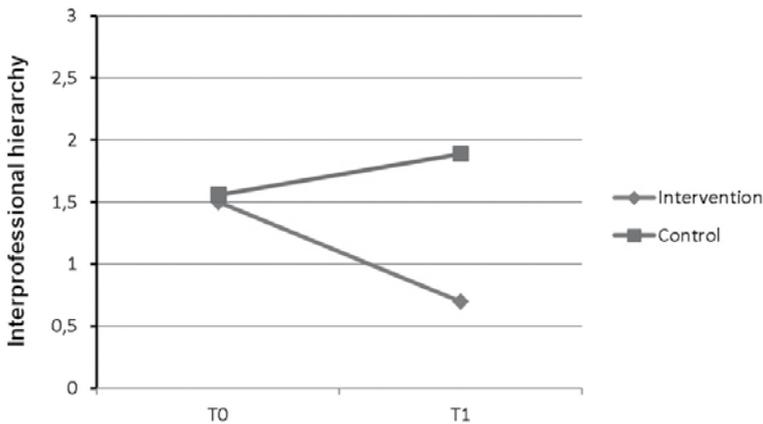
Time=Interprofessional hierarchy at T0 and T1; Cond.=Experimental condition (intervention versus control); Time*Cond.=interaction between Time and Experimental condition. 95% Confidence Interval

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.

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