Empirical Verification of Different Rank Dynamic Roles in Informal Hierarchies

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Organizations today face a more volatile, uncertain, complex and ambiguous market environment, referred to by the term »VUCA world«. To this, they commonly respond with management approaches that comprise flat hierarchies and a decentralization of decision-making structures. But while some companies are very successful with such approaches, others struggle significantly. One reason is that conflicts about ranks in the informal hierarchy arise as the formal hierarchy diminishes. Hence, understanding group dynamics and the different strategies of team members in the social competition becomes increasingly important. In previous works, a theoretical model containing five different roles was presented. These roles result from specific psychological capabilities, values, and needs of each individual and include specific contributions to the social functioning of the group. In this paper, participants of an online survey have been asked about their contribution to team success. A subsequent factor analysis of n = 421 datasets proofed the existence of five different roles and, thus, the validity of the model.

Keywords: new work, working culture, group dynamics, informal hierarchy, rank dynamics, leadership, status

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1 The History of Leadership and Group Dynamics Research

After World War II, research on sociology and psychology was highly motivated by recent experiences and focused on explaining the phenomena of the war. Against this background, Milgram published his works on obedience which were broadly discussed not only in the scientific community (1963). At the same time, Schindler worked on the »bifocal group therapy« for schizophrenic patients (Schindler 2016, Spaller 2018). An important component were his observations of the »rank order positions« within the group, which was how he found the negative influence of authority on the psychological well-being of the patients. As a byproduct he developed the rank dynamic model, becoming the epitome of group dynamic research. Nevertheless, it took half a century until empirical verification took place (Bachmann 2022).

In general, the idea that aggression and authority should be accepted as intrinsic parts of human nature has been a difficult strand in academic debates. It is to the credit of behavioral psychologists like Lorenz that the reason and the benefits of aggression did not vanish completely from scientific attention. In his studies of animal behavior, he considered aggression to be »an element within the concert of drives« (Lorenz 1963), meaning that it fulfills certain functions that a species cannot do without. However, the more social a species is, the more aggression is expressed through a complex set of signals. This allows conflicts to escalate in a controlled manner, and the individuals involved can surrender before suffering serious injury. In consequence, the knowledge about the opponents' strengths leads to a rank order within a pack that additionally prevents perpetual conflicts.

In later decades, evolutionary psychologists identified many similarities between animals and humans, and legitimately challenged the view that humans could be outstandingly more rational and civilized than animals in social groups (Buss 2015). However, publications in this field have focused mainly on mating and only little on the importance of rank dynamics for human behavior in the context of work and leadership.

In business practice, the attitudes were ambivalent. In 1960, McGregor defined Theory X and Theory Y (1960), suggesting that managers would just have to trust their employees to create a better and more productive work environment. In 1978,

Bergmann first wrote about New Work (2019). But for a long time, management thinking was still dominated by a Tayloristic stance. Command-and-control was widely seen as the only way to coordinate large undertakings. It was in the nineties, when the New Economy and the IT skill shortage led to a revolution in project management and leadership (Duhigg 2016). Creativity, flexibility, and employer attractiveness gained higher importance. Liberal approaches, such as Design Thinking and agile project management, began to replace the overly excessive bureaucracy and rigidity of previous approaches, slowly shifting responsibility to the employee level. At the same time, formal hierarchy was being reduced, the informal hierarchy kicked in and became more important for successful project implementation (Diefenbach & Sillince 2011). This aspect has been widely neglected and might be one of the possible reasons why numerous companies have been struggling a lot with New Work formats (Busch & Link 2021).

2 Rank Dynamic Mechanisms and Strategies in Recent Works

For a deeper understanding of the influence and the mechanisms of informal hierarchies, the characteristic behavior of individuals in gaining a best-possible rank must be known. Schindler's model may be a clue but seems not yet specific enough. The applicability of Schindler's role definitions, derived from psychiatric patients to business teams may suffer from certain weaknesses – especially since the patients had no reason to compete for salary or promotion. It is therefore unclear whether the role definitions accurately reflect the roles that occur in the business context, or whether there are more roles that should be considered.

In previous work, the author presented a model describing how ranks are negotiated within groups (Vatter & Kugler 2022). According to this, the root of rank dynamics is the competition for resources, like food, influence on group decisions, mating partners, and the psychological pleasantness of attention or admiration. As they are limited, group members compete for them against each other. Simultaneously, they must cooperate with each other to gain resources and ensure the continued existence of the group. This balancing between competition and cooperation is an ongoing decision each individual has to make.

An individual´s decision is based on the factors (Fig. 1):

1. the individual's psychological *capabilities*, like the ability to endure conflicts or act in a socially valued manner,
2. the individual's *values*, expressed in the behavior regarded as acceptable or socially appropriate.
3. the individual's psychological *needs*, like the need for admiration or being admitted to a group in a harmonious manner, and

Depending on these factors, a group member forms a strategy on how to compete in the rank dynamic within a team. This strategy manifests itself in certain patterns of behavior that can be interpreted as signals about what kind of contributions others can expect.

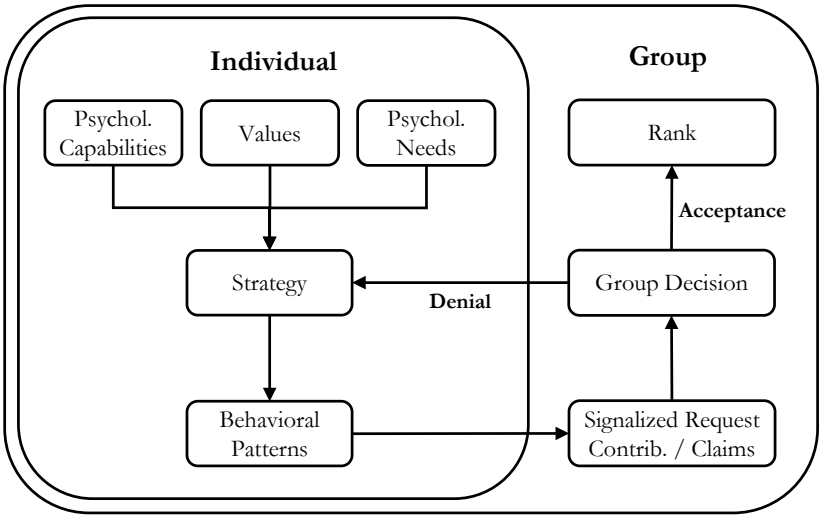

Figure 1: Rank Dynamic Negotiation Model
Source: According to Vatter & Kugler 2022

The group then decides on behalf of three questions if it trusts the signals given:

1. Is the individual *able* to make the promised contribution?
2. Is the individual *willing* to make the promised contribution?

3. Is the *need* for the promised contribution higher than the resources claimed (or are other team members providing this kind of contribution sufficiently)?

The first two questions are highly based on uncertainty. Therefore, any signal associated with costs, such as the risk of punishment, is valued more than the plain verbal statement (McAndrew 2002, 2018). If all three questions are answered with yes, the individual is granted the desired rank in the informal hierarchy. If not, challenged role owners receive the support of the group and the challenger typically must resign to a lower rank. Therefore, not all individuals thrive for the highest rank, as they may lack the needed abilities or rather avoid the associated costs and risks. Some individuals prefer a lower rank which still provides enough resources to survive.

On this behalf, Vatter & Kugler reviewed Schindler's role definitions and compared them to observations in business environment (2022). Hence, the roles have been revised as following:

- The *Alpha role* was kept unchanged the leader of the group. Its contribution is to coordinate the activities of the group and allocate resources. Moreover, it defines the rules within the group and takes uncomfortable but necessary decisions, e.g., the expulsion of a member from the group (see below). By assuming responsibility, it lowers the psychological stress of the other team members.
- The *Beta role* was defined as Alpha's assistant.[8] Therefore, it is assumed to have good social skills and the ability to be subordinate and loyal. In addition, it contributes by providing positive emotions and by carrying out Alpha's orders. The contribution to the group is to provide order and maintain social cohesion.
- A new *Delta role* forms the middle class of a group, preferring a secure and stable rank without prospect of a leadership position.[9] Its contribution lies in its labor, both manual and intellectual. It is characterized by a preference for structure and therefore advocates authority.

[8] In contrast to Schindler's definition, Beta is not primarily providing workforce (see Delta).

[9] Best comparable to Schindler's Beta

- The *Gamma role* represents the opposition to Alpha and embodies the alternative perspective of various matters.[10] In its rebellious attitude it is convinced it was the better leader but lacks the followership of the other members. By providing an additional point of few, Gamma limits Alpha's scope of action and prevents arbitrary decisions. Thus, Gammas most important contribution is to hold up a regulatory mechanism.
- The *Omega role* is on the last rank of the informal hierarchy. The group does not recognize any useful contribution from its side. It is unable to defend against the group's aggression and is therefore at risk of being excluded from the group.

3 Hypothesis and Objective of This Work

Even though social behavior is complex and may vary significantly in different situations and over time, there are arguments that make it seem plausible that the number of roles is limited. This is, because a group's social needs for psychological contributions may be manifold, but still finite. Additionally, roles should be easy to detect, so other group members can easily understand what kind of contribution an individual is promising. Moreover, pretending a certain behavior consistently is very difficult. So, coherent behavior makes the signaled proposal more reliable. For these reasons, roles should be Nash equilibria and corresponding strategies most successful if consistently adhered to (Holt & Roth 2004). If these assumptions are true, a specific set of roles should be detectable.

Hence, the aim of this paper is to verify the existence of the mentioned roles in the informal hierarchy.

4 Data Collection and Analysis

Based on the given role definitions, a self-assessment questionnaire has been designed. Each of the five scales was represented by six items (Alpha: A1 – A6, Beta: B1 – B6, …). To increase participant acceptance of the questionnaire and the

[10] We agree with Bachmann that Schindler's Omega role should be divided into an »active Omega« and a »passive Omega«. The switch in names seems appropriate, as they are loacted on different rank levels and »Omega« should be used for the lowest rank in the group.

discrimination, a seven-point Likert scale was used for the response category, ranging from "totally agree" to "totally disagree". A seven-point Likert scale is easy to understand, reduces the "middle effect", and positively contributes to the discriminative power of the items. The items were constructed targeting an individual's contribution to the group. This was considered meaningful as asking for the contribution is positively connotated and truthful answers can be expected. Additionally, the contributions seemed to be a good distinguishing feature of a role. When finding questions for contributions was found impossible, especially for the Omega role, other significant characteristics of the role are determined.

A pretest was carried out with five test persons which led to some adjustments in the wording of the final items (Tab. 1). The survey was implemented as online questionnaire and was distributed among students and on various social media platforms. The author's university is mainly aimed at working students. It can therefore be assumed that the participants have several years of professional experience. In total, 457 subjects, mainly German citizens, completed the test.

The resulting datasets had been undergone several plausibility checks, such as the relative speed index RSI < 2. So, dubious entries were excluded beforehand the analysis and no further statistical outlier handling was pursued. This resulted in n = 421 usable datasets in total.

4.1 Descriptive Analysis and Assessment of Model Quality

In the resulting data 53 % of the test persons were male and 47 % female. 54 % of all test persons were between 20 and 29 years old, 19 % between 30 and 39, 11 % between 40 and 49 and 14 % over 50 years old. 5 % had a secondary school diploma (ger.: Qualifizierter Hauptschulabschluss), 19 % medium maturity (ger.: Mittlere Reife), 28 % a high-school diploma (ger.: Abitur) and 48 % a university degree. PhD and no diploma both ranked below 1 %. 65 % of all participants reported to be working, while 34 % were studying. This may be inaccurate as most students at that university work regularly and study part-time.

In the first step of the analysis, the model validity was determined. Cronbach's Alpha showed values between 0.45 and 0.90, the discriminatory power was between 0.06 and 0.80. In particular, some items of the Delta and Gamma scales showed weak

values. To correct this, the analysis was continued with an exploratory factor analysis (EFA).

4.2 Exploratory Factor Analysis (EFA)

The applicability of the EFA was tested using the Kaiser-Meyer-Olkin test, which showed values between 0.72 and 0.96 (Bühner 2021). Hence, the EFA could be applied. The EFA was performed in form of a parallel analysis with resampling and 2,000 repetitions, applying the Weighted Least Square method (WLS). The resulting eigenvalues showed a value within the confidence interval for a five-factor model (Fig. 2). So, the presence of five factors has been proven.

Then, the EFA was proceeded to determine the factor loadings (Tab. 2). The Promax rotation and the WLS estimation have been used. The item complexity turned out to be 1.5. According to the results, three items (B5, D4 and D5) have been removed from the list of items. Two further items have been assigned to different scales as the cross-loadings were significantly higher than the loadings on the initially intended scale (B6 to Alpha, G1 to Omega). By this, the quality characteristics improved significantly. None of the discriminatory powers were below 0.20. By this, the Cronbach's Alpha of the Delta scale increased to 0.51.

Table 1: Rank dynamic self-assessment questionnaire

	Items[11]
A1	In the team, I have the final say in decisions.
A2	I am more responsible for the team's results than the other team members.
A3	I set the goals in the team and take over the organization.
A4	I take charge of the team in critical situations.
A5	I act as a spokesperson between my team and external stakeholders.
A6	I see my contribution to the team as taking on leadership responsibilities.
B1	I mediate in interpersonal conflicts within the team.
B2	I exert a positive influence on the team leadership.
B3	I promote social cohesion in the team.
B4	I maintain a good relationship with the team leader.
B5	I contribute my professional expertise to the team.
B6	I enforce the team's rules when someone steps out of line.
D1	My actions in the team represent the team's labor power.
D2	As a team member, I primarily increase the team's labor power.
D3	I perform the intellectual or manual work tasks in the team.
D4	My contribution to the team is mainly the completion of work.
D5	It's ok if I do not have to participate in decisions and only do the tasks.
D6	I prefer direct task accomplishment rather than discussion about it.
G1	The team does not have clear goals and structures for me.
G2	I criticize the coordinated approach in the team.
G3	I exhibit unconventional working methods compared to colleagues.
G4	In the team, I critically question the current approach.
G5	I constantly think about the improvement of the team.
G6	I question the status quo of the team.
O1	The team does not let me participate in decision-making processes.
O2	My views are ignored by the team.
O3	The team does not cooperate with me.
O4	I am the scapegoat of the team.
O5	I am not a full team member.
O6	I cannot speak freely and openly in the team.

[11] For the items' original German wording, see Weisbeck 2023

Table 2: Factor loadings of rank dynamic self-assessment survey*

Item	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
A1	0.80				
A2	0.75				
A3	0.81				
A4	0.78				
A5	0.59				
A6	0.87				
B1	0.40	0.56			
B2		0.34			
B3		0.80			
B4		0.43			-0.36
B5					-0.31
B6	0.61				
D1			0.42		
D2			0.52		
D3			0.43		
D4	-0.32		0.36		
D5	-0.36				0.31
D6			0.43		
G1					0.43
G2				0.49	
G3				0.46	
G4				0.87	
G5				0.42	
G6				0.64	
O1					0.40
O2					0.71
O3					0.67
O4	0.40				0.60
O5					0.51
O6					0.65
	Alpha	Beta	Delta	Gamma	Omega

* Factor loadings < 0.3 have been removed.

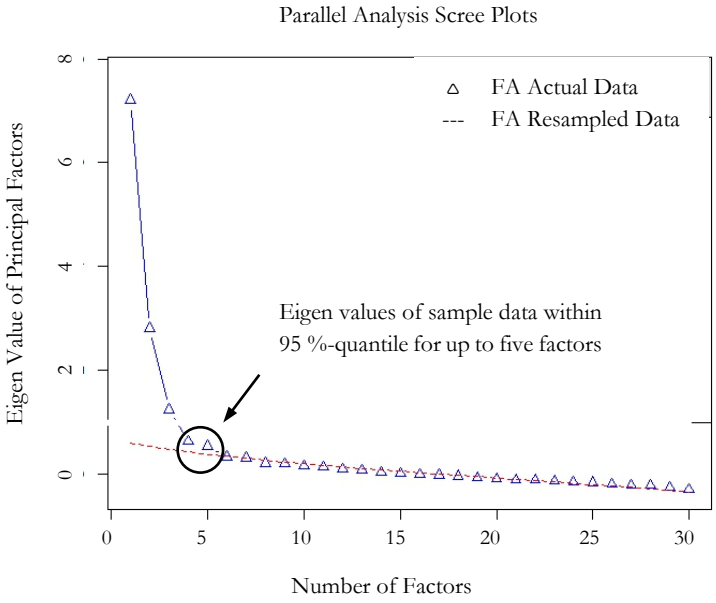

Figure 2: Parallel Analysis Scree Plots

4.3 Calculation of Higher Order EFA

After this, the correlations between the five factors were calculated and showed significant values between -0.43 and 0.62. Therefore, a general factor g was considered and a higher order EFA was calculated. The results showed the following loadings onto the general factor: Alpha: 0.7, Beta: 0.7, Delta: 0.4, Gamma: 0.8, Omega: -0.3. These correlations can be interpreted as similarities in the characteristics of the five roles.

The loadings can—with all due caution—be interpreted as amount of contribution a role makes to the group. This seems plausible as all roles do contribute to the group except the Omega role. Thus, it is prone to being excluded from the group, as the theory suggests.

4.4 Confirmatory Factor Analysis (CFA)

Lastly, a confirmatory factor analysis (CFA) has been performed to confirm the validity of the model. There, the higher order model (with general factor g) and the regular model (without general factor g) were compared. Their quality characteristics were calculated as shown in table 3.

Table 3: Quality characteristics of CFA

	CFI	TLI	RMSEA	SRMR	χ^2-Test
Good Fit	≥ 0.97	≥ 0.97	≤ 0.05	≤ 0.05	≤ 2
Acceptable Fit	≥ 0.95	≥ 0.95	≤ 0.08	≤ 0.10	≤ 3
Regular Model (without general factor)	0.973	0.970	0.042	0.065	1,75
Higher Order Model (with general factor)	0.961	0.957	0.050	0.072	2.06

The regular model performed well on behalf of almost all quality criteria (Gäde 2020, p. 649). Only the SRMR value was 0.065 and, thus, can be considered as acceptable only. The higher order model performed acceptable on almost all quality criteria. Only the RMSEA value was 0.050 and, thus, is regarded as good fit. This means the higher order model did slightly worse than the regular model without the general factor g. This is traced back on the fact that the higher order equation must fulfill more conditions as the regular model.

5 Relevance for business teams

To establish a good working culture, it first must be clarified what this really means. It is a common misunderstanding that the best working culture would be as cooperative as possible and totally free of conflicts. On closer inspection, this turns out to be untrue. Conflicts, in general, occur for the purpose to find the right decision about group related issues. For this can be done efficiently, an intact informal hierarchy is needed. Rank dynamic conflicts are necessary to constantly adjust the informal hierarchy and create a rank dynamic structure every member of group can live with. Avoiding these conflicts means stalling the process and preventing the group from reaching a productive state. This means, conflicts must

be managed, so they can take an appropriate share in a balanced mix of a team's social interactions. For a long-term success, leaders need to ask:

1. Is the *informal hierarchy* of the team balanced? Is there an adequate mixture of informal roles?
2. Is the *relation of competition and cooperation* balanced? Can group members have the conflicts they need to have and are those resolved quickly and do not consume unnecessary energy?
3. Am I accepted as the *instance that sets the norms* according to which conflicts are fought out?

If the last point is given, the team leader steer the team by cultural norms. This means, that there is a common understanding, which kind of behavior is accepted and what will not be tolerated. This has many advantageous over the directives as they are commonly applied. Those are circumvented by competitive or unsatisfied employees where possible. In the first case, cooperative employees are protected by cultural norms and can freely live out their creativity and compete in terms of the individual strengths.

6 Summary and Outlook

The success of project teams, particularly when new liberal leadership approaches are applied, highly depend on a functioning group dynamic. Team members make specific contributions to the team, depending on their psychological capabilities, needs and values, competing for a specific rank in the group. In the present paper, Schindler's set of roles has been slightly adjusted, so the match better to the circumstances of work environments. A self-assessment questionnaire has been designed and a survey was carried out. A factor analysis showed that the five factors could be determined which is a strong indication for the existence of the roles.

Though this may be considered as a major step ahead, there are three main limitations to this work. First, the results are solely based on self-assessment and do not proof that other team members share the appraisal of the test subjects. Therefore, an alignment with a third person assessment will be subject of subsequent work. Second, it is not clear if the assumed rank order can really withstand in real conflict situations and group resources are assigned accordingly. There might be

more influence factors which determine, who wins a confrontation in a real-world environment. This intensifies as a large proportion of test-persons were students with an unknown amount of work experience. Thus, the model needs more validation on behalf of the outcome of competitive experiments or field observations.

The third limitation refers to the definition of the roles. Even though their existence seems without doubt there is a lack of detailed description and a full understanding of their motives, behavioral patterns, and interaction. Thus, a deeper qualitative investigation and further adjustment seem to be justified. Moreover, it is not excluded that there are further important roles which occur less frequently, and so they could not be detected with the given item set.

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