

Multicultural Leadership and Racial Equality in the Algorithm-Driven Economy

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Introduction

The rise of artificial intelligence (AI) has enabled organizations to perform a series of analytical and forecasting work effectively (Brynjolfsson & Mitchell, 2017). Considering its automation mechanism based on massive objective data, AI algorithms have been touted as a rapidly advancing form of technology that could help defy common human biases (Daugherty & Wilson, 2018; Raisch & Krakowski, 2021). However, a nascent body of evidence has increasingly accumulated to suggest that algorithms may reproduce gender and racial biases. For example, the illness diagnosis algorithms consider Black patients substantially sicker than White patients with the same risk score, as suggested by signs of uncontrolled illness (Obermeyer et al., 2019), facial recognition systems used for security or law enforcement perform worse on identifying faces of Black individuals (Klare et al., 2012), searches for Black-sounding names trigger more ads for crime records (Sweeney, 2013), and image searches for occupations such as IT technicians or stock traders produce fewer results of black images (Kay et al., 2015). Such less overt racial disparities in algorithmic treatment would inadvertently produce pernicious consequences that perpetuate social and economic inequality (Korinek & Stiglitz, 2021).

Researchers have insinuated that such algorithmic biases, to a large extent if not solely, derive from the process through which developers monotonically leverage massive data accumulated from available observations to build and train those algorithms without considering racial differences (Obermeyer et al., 2019). Premised on the assumption that the AI algorithm could formulate individualized solutions based on personal data provided by each prospective serving target, algorithm developers tend to unconsciously ignore racial disparities deeply

embedded in data available for them to construct the algorithm (Iansiti & Lakhani, 2020). Moreover, those who utilize AI algorithms for their work often blindly follow the prediction and recommendation automatically made by the algorithms, creating a “double-bind” for racial minorities (Anthony, 2021). The lack of racial awareness among those algorithm developers and users, as a result, may pose a challenge for the algorithm-driven economy as to how AI algorithms could provide racial-neutral solutions and thus help enhance social and economic equality (Raisch & Krakowski, 2021).

In this project, I draw on leadership research to study how algorithm developers could develop and maintain strong racial culture awareness so that they could build and train algorithms that could be tailored to racial minorities. In doing so, I integrate research on diversity ideologies (Fowers & Richardson, 1996; Leslie et al., 2020) with the literature on cultural capital (Bourdieu, 1986), I develop multicultural leadership as an effective leadership approach that leaders could enact to facilitate the racial-neutral algorithm construction by increasing developers’ racial culture awareness.

I define *multicultural leadership* as leaders’ a) social and intellectual recognition and appreciation of the unique cultural identity of group members, b) proper integration of different cultural knowledge in group processes, and c) strategic deployment of culturally relevant resources to transform the culturally divergent knowledge into convergent competitive advantages of the group. Multicultural leadership encompasses three sub-dimensions, including *cultural identity recognition*, *cultural integration*, and *cultural capitalization*.

Cultural recognition refers to leaders attending to different cultural backgrounds of group members, inquiring about their divergent cultural knowledge, and appreciating their unique cultural identity (Ely & Thomas, 2001; Hajro et al., 2017). Cultural integration involves leaders

fostering multilateral learning of different cultural knowledge, enhancing multicultural consensus among group members, and establishing common cultural grounds that enable collaboration with the maintenance of original cultural integrity (Nishii, 2013). Cultural capitalization captures leaders mobilizing multicultural intellectual resources to facilitate the pursuit of strategic competitive advantages (Bourdieu, 1986).

Situating my research in the tech firms that build AI algorithms and firms that use AI algorithms to formulate work solutions for serving targets, I argue that the effects of multicultural leadership on reducing racial inequality unfold through two parallel lines. The first one is that multicultural leadership in tech firms makes algorithm developers more attentive to the racial/ethnic differences and uniqueness in the data collection that is used for algorithm building (Obermeyer et al., 2019). Such racial attentiveness then may motivate algorithm developers to tailor their algorithm to racial/ethnic minorities. The second one is that in firms that use AI algorithms, multicultural leadership increases employees' attentiveness to potential racial blindness in algorithm-automated solutions (Anthony, 2021). As a result, employees may adjust the solutions in a way that matches racial and ethnic differences.

In the first stage of this project, I primarily focused on developing a scale of multicultural leadership that is generalizable across different cultural groups and social identities. I followed Hinkin's (1998) procedures to develop this measurement.

Multicultural Leadership Scale Development

Phase 1: Item Generation and Reduction

Following prior management studies on scale development (Dang & Joshi, 2023; Miron-Spektor et al., 2018; Owens et al., 2013), I used a deductive scale development approach to formulate items corresponding to the three dimensions based on a systematic and extensive

review of relevant literature on leadership (Leslie et al., 2023), diversity (Martins, 2020; Richard, 2000), ideology (Dang et al., 2022; Leslie et al., 2020), and inclusiveness (Nishii, 2013). The deductive approach helps ensure the content validity of the measure because the items were developed in conjunction with the concepts of relevant constructs (Hinkin, 1998).

Specifically, I developed an initial pool of items based on my conceptualization of three dimensions. I generated items by reviewing key academic and practical articles on relevant topics and by conducting brief interviews with work professionals who were in managerial roles or who worked in multicultural contexts. I tried to expand the scope of behavioral manifestations that the items covered while maintaining consistency with the framework I developed a priori. The initial pool encompassed 20 items for cultural recognition, 15 items for cultural integration, and 15 items for cultural capitalization (1 = *strongly disagree*, 4 = *neither disagree nor agree*, 7 = *strongly agree*). I then presented the initial items and the definition of each dimension to a panel of 15 leadership scholars and practitioners and asked them to assess the content validity of these items by sorting them into the corresponding dimensions (Anderson & Gerbing, 1991). I retained the items with 90% or higher rates of precise categorization from the panel. This yielded 10 items for cultural recognition, 9 items for cultural integration, and 8 items for cultural capitalization for subsequent scale development work (See Table 1 for item details).

Phase 2: Exploratory Factor Analysis

I conducted two separate studies sequentially on Prolific (Peer et al., 2017) for the exploratory factor analysis (EFA). In Study 1A, I invited 326 full-time work professionals who interacted with leaders and group members frequently on a daily basis in a multicultural context. Participants completed a survey assessing the multicultural leadership behaviors of their leaders in exchange for 2.50 dollars. These participants were from diverse racial/ethnic backgrounds

(42% White, 16% Black, 27.6% Asian, 6.1% Latino/Hispanic or Caribbean, 1.2% Middle East, and 6.4% Mix or others), 51.4% were men, 74.4% were college educated, they had an average age of 37.04 ($SD = 10.54$), and they worked in a group with members from at least two distinct cultural backgrounds (10.7% for two, 35.0% for three, and 53.7% for four or more).

I conducted a principal-axis factor analysis with varimax rotation. Results of the eigenvalues, screen plots, and factor loadings revealed a three-factor solution. Extraction sums of squared loadings were 14.622, 2.827, 1.380, accounting for 54.157%, 10.469%, and 5.112% of the total variance, respectively (see Figure 1 for variance screen plot). Figure 2 presents the factor loading plot in rotated factor space. We retained items (1) that had factor loadings of $>.70$ on the corresponding factor and (2) that had factor loadings of $<.40$ on the other factors. Table 1 reports the details of factor loadings in Study 1A.

I cross-validated the scale in Study 1B using a separate group of 217 work professionals on Prolific after I concluded the first study. Likewise, participants, who worked in a multicultural context and interacted with colleagues frequently, filled up a survey measuring multicultural leadership behaviors of their leaders in exchange for 2.50 dollars. These participants were from diverse racial/ethnic backgrounds (53.7% White, 17.4% Black, 11.5% Asian, 6.4% Latino/Hispanic or Caribbean, 2.8% Middle East, and 7.3% Mix or others), 46.8% were men, 69.1% were college educated, they had an average age of 37.27 ($SD = 10.63$), they worked in a group with members from at least two distinct cultural backgrounds (18.1% for two, 29.6% for three, and 52.3% for four or more). Analogously, Study 1B results suggested a three-factor solution. Extraction sums of squared loadings were 15.257, 2.187, 1.529, accounting for 56.506%, 8.100%, and 5.661% of the total variance, respectively (see Figure 3 for variance screen plot). Figure 4 presents the factor loading plot in rotated factor space in Study 1B.

Based on results from two studies, I retained a 17-item scale of multicultural leadership (7 items for cultural recognition, 5 items for cultural integration, and 5 items for cultural capitalization). I am conducting further studies to validate the scale using other samples, examine the discriminant validity of the scale, and test the proposed effects on multicultural leadership.

Multicultural Leadership and Racial-Aware Algorithm Development (Ongoing Studies)

Following the initial scale development, I then explore how multicultural leadership in the tech firms triggers cultural epistemic motivation among software engineers and programmers and makes them more attentive to cultural and racial differences in the data that they accumulate to develop and train those algorithms (Obermeyer et al., 2019). Some key insights arise from my initial brief interviews with software engineers and programmers. For example, one software engineer shared that the more the direct manager asked about each member's cultural rituals and behavioral tendencies, the more frequently the work team engaged in discussions regarding whether the algorithms they were developing could be suitable for all populations of interest from different races and cultural backgrounds. Likewise, another programmer discussed a big “aha” moment shared by group members when they started to realize that cultural beliefs and norms often had ingrained effects on the differences in their thinking and behavioral patterns. That was also the moment when they started questioning whether the algorithms would be aware of those differences. Building on the preliminary knowledge, I am continuing to navigate, theorize, and empirically examine the key underlying mechanisms through which multicultural leadership facilitates a culture- and race-attentive process of algorithm development.

References

- Bourdieu, P. (1986). Forms of Capital. In J. G. Richardson (Eds.), *Handbook of Theory and Research for the Sociology of Education*. Greenwood, New York.
- Brynjolfsson, E., & Mitchell, T. (2017). What can machine learning do? Workforce implications. *Science*, 358(6370), 1530-1534.
- Dang, C. T., Volpone, S. D., & Umphress, E. E. (2023). The ethics of diversity ideology: Consequences of leader diversity ideology on ethical leadership perception and organizational citizenship behavior. *Journal of Applied Psychology*, 108(2), 307.
- Daugherty, P., & Wilson, H. J. 2018. *Human-machine: Reimagining work in the age of AI*. Boston, MA: Harvard Business Review Press.
- Datta, A., Tschantz, M. C., & Datta, A. (2014). Automated experiments on ad privacy settings: A tale of opacity, choice, and discrimination. *arXiv preprint arXiv:1408.6491*.
- Ely, R. J., & Thomas, D. A. (2001). Cultural diversity at work: The effects of diversity perspectives on work group processes and outcomes. *Administrative Science Quarterly*, 46(2), 229-273.
- Fowers, B. J., & Richardson, F. C. (1996). Why is multiculturalism good?. *American Psychologist*, 51.
- Hajro, A., Gibson, C. B., & Pudelko, M. (2017). Knowledge exchange processes in multicultural teams: Linking organizational diversity climates to teams' effectiveness. *Academy of Management Journal*, 60, 345-372.
- Hinkin, T. R. (1998). A brief tutorial on the development of measures for use in survey questionnaires. *Organizational Research Methods*, 1, 104-121.
- Kay, M., Matuszek, C., & Munson, S. A. (2015, April). Unequal representation and gender stereotypes in image search results for occupations. In *Proceedings of the 33rd annual ACM conference on human factors in computing systems* (pp. 3819-3828).
- Klare, B. F., Burge, M. J., Klontz, J. C., Bruegge, R. W. V., & Jain, A. K. (2012). Face recognition performance: Role of demographic information. *IEEE Transactions on Information Forensics and Security*, 7, 1789-1801.
- Leslie, L. M., Bono, J. E., Kim, Y. S., & Beaver, G. R. (2020). On melting pots and salad bowls: A meta-analysis of the effects of identity-blind and identity-conscious diversity ideologies. *Journal of Applied Psychology*, 105, 453.
- Leslie, L. M., Flynn, E., Foster-Gimbel, O. A., & Manchester, C. F. (2023). Happy talk: Is common diversity rhetoric effective diversity rhetoric? *Academy of Management Journal*. Forthcoming.
- Obermeyer, Z., Powers, B., Vogeli, C., & Mullainathan, S. (2019). Dissecting racial bias in an algorithm used to manage the health of populations. *Science*, 366, 447-453.
- Peer, E., Brandimarte, L., Samat, S., & Acquisti, A. (2017). Beyond the Turk: Alternative platforms for crowdsourcing behavioral research. *Journal of Experimental Social Psychology*, 70, 153-163.
- Martins, L. L. (2020). Strategic diversity leadership: The role of senior leaders in delivering the diversity dividend. *Journal of Management*, 46, 1191-1204.
- Raisch, S., & Krakowski, S. (2021). Artificial intelligence and management: The automation–augmentation paradox. *Academy of Management Review*, 46(1), 192-210.
- Richard, O. C. (2000). Racial diversity, business strategy, and firm performance: A resource-based view. *Academy of Management Journal*, 43(2), 164-177.

Table 1
Multicultural Leadership Scale Descriptive Statistics and Factor Loadings in Studies 1A & 1B

Scale items	Study 1A					Study 1B				
	<i>M</i>	<i>SD</i>	Factor 1	Factor 2	Factor 3	<i>M</i>	<i>SD</i>	Factor 1	Factor 2	Factor 3
<i>Factor 1: cultural recognition</i>										
1 My leader appreciates the cultural differences that members bring to the group	5.65	1.24	.766	.202	.259	5.84	1.12	.759	.255	.300
2 My leader values the unique cultural identity of each group member	5.63	1.13	.764	.192	.249	5.77	1.14	.734	.281	.312
4 My leader shows respect for cultural knowledge that is important to group members	5.69	1.16	.762	.171	.272	5.87	1.10	.743	.209	.270
6 My leader understands different cultural rituals or observances that are important to group members	5.57	1.16	.767	.104	.199	5.60	1.24	.708	.222	.260
13 My leader listens to what group members are concerned about regarding their different cultural backgrounds	5.39	1.27	.764	.184	.309	5.60	1.24	.755	.259	.319
14 My leader shows concern for group members' personal feelings about their unique cultural backgrounds	5.42	1.26	.737	.235	.234	5.59	1.16	.815	.268	.172
45 My leader cares about members from different cultures for who they are as unique individuals, not solely for the job that they perform	5.67	1.22	.748	.154	.248	5.80	1.20	.720	.236	.367
32 My leader provides flexibility in work arrangement to accommodate cultural observances or rituals of group members	5.42	1.25	.606	.272	.163	5.69	1.24	.621	.201	.282
10 My leader provides assistance to group members with cultural challenges that they experience	5.14	1.28	.676	.295	.290	5.28	1.33	.678	.330	.196
34 My leader tailors work practices to the unique cultural needs or preferences of individual group members	4.65	1.50	.448	.422	.363	4.70	1.56	.476	.372	.254
<i>Factor 2: cultural capitalization</i>										
40 My leader strategically deploys cultural resources held by group members (such as linguistic abilities and knowledge of cultural rituals, habits, or practices) to broaden the business scope of our group	4.32	1.62	.175	.809	.194	4.43	1.66	.258	.799	.285
41 My leader strategically mobilizes cultural resources held by group members (such as linguistic abilities and knowledge of cultural rituals, habits, or practices) to strengthen the business capabilities of our group	4.35	1.63	.236	.727	.178	4.50	1.61	.260	.795	.219
39 My leader utilizes the cultural knowledge of group members to refine the business (or strategic) plans of our group	4.25	1.61	.167	.783	.324	4.46	1.63	.292	.758	.257
50 My leader leverages unique cultural connections that group members maintain (such as connections with specific ethnic communities) to grow our business opportunities strategically	4.23	1.59	.124	.751	.226	4.44	1.59	.185	.735	.324
49 My leader constantly explores the cultural knowledge of group members to create more business opportunities for our group	4.17	1.64	.154	.794	.303	4.43	1.56	.245	.744	.386

48 My leader incorporates cultural ideas suggested by group members in our business (or strategic) planning	4.45	1.58	.281	.699	.324	4.51	1.59	.372	.719	.211
42 My leader strategically uses cultural insights of group members to improve group work outcomes	4.44	1.55	.251	.755	.310	4.66	1.53	.317	.669	.366
43 My leader strategically recruits and retains talents from diverse cultural backgrounds to build the competitive advantages of the group	4.59	1.57	.260	.523	.273	4.77	1.60	.365	.524	.338
Factor 3: cultural integration										
15 My leader facilitates the exchange of unique cultural ideas among group members to enhance mutual understanding	4.50	1.45	.280	.291	.738	5.04	1.32	.314	.320	.745
18 My leader helps group members learn from each other's cultures to develop a shared understanding of multicultural differences	4.52	1.52	.316	.381	.722	5.00	1.39	.280	.369	.713
36 My leader actively solicits perspectives of group members from diverse cultural backgrounds to improve group work collaboration	4.62	1.42	.349	.393	.721	5.10	1.43	.312	.316	.735
28 My leader facilitates mutual learning of diverse cultural insights among group members to explore how our cultures complement each other	4.51	1.51	.370	.327	.716	4.91	1.42	.318	.344	.713
47 My leader actively invites input from group members with different cultural knowledge to make the group work better together	4.91	1.43	.394	.337	.703	5.38	1.29	.313	.295	.727
17 My leader encourages the sharing of different cultural knowledge to reduce potential intercultural misunderstanding among group members	4.74	1.53	.346	.402	.665	5.13	1.48	.375	.326	.660
23 My leader seeks diverse cultural insights from group members to refine group work processes	4.54	1.44	.355	.480	.482	4.92	1.48	.369	.465	.542
46 My leader actively engages members from different cultures in decision making processes to facilitate group work collaboration	4.83	1.50	.420	.333	.551	5.37	1.40	.392	.194	.546
35 My leader provides members with autonomy in accommodating different cultural needs/preferences to facilitate group work collaboration	4.66	1.45	.397	.415	.509	5.44	1.19	.502	.307	.371

Note. $N = 326$ in Study 1A, $N = 217$ in Study 1B. Items in black were those retained for our final multicultural leadership scale and items in grey were those removed from the final multicultural leadership scale. Bolded factor loadings suggested items loaded in corresponding factors.

Figure 1. Total Variance Explained by Extracted Factors in Study 1A

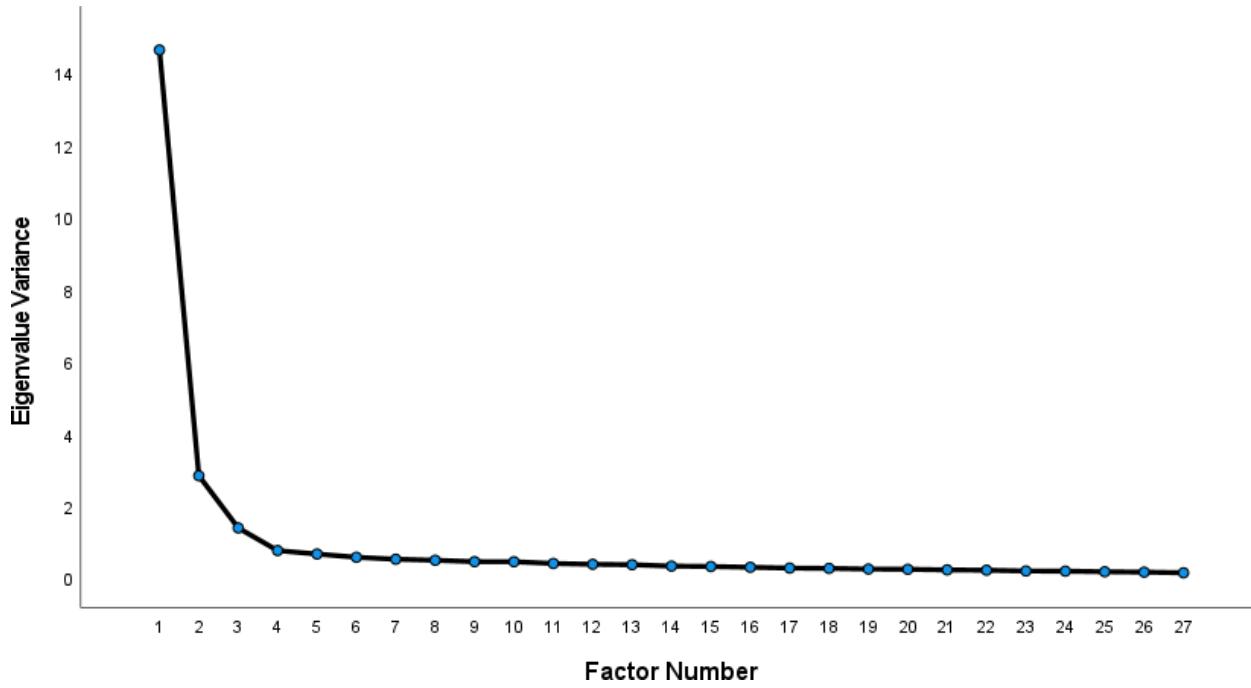


Figure 2. Factor Plot in Rotated Factor Space in Study 1A

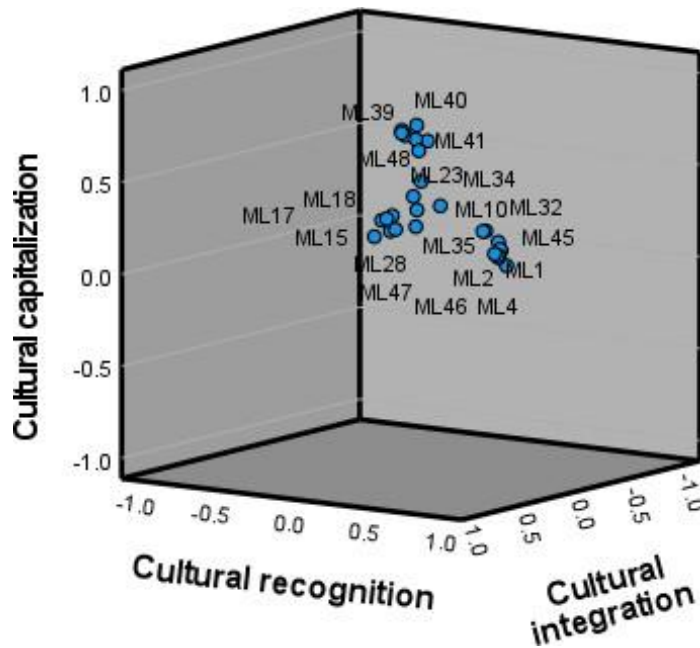


Figure 3. Total Variance Explained by Extracted Factors in Study 1B

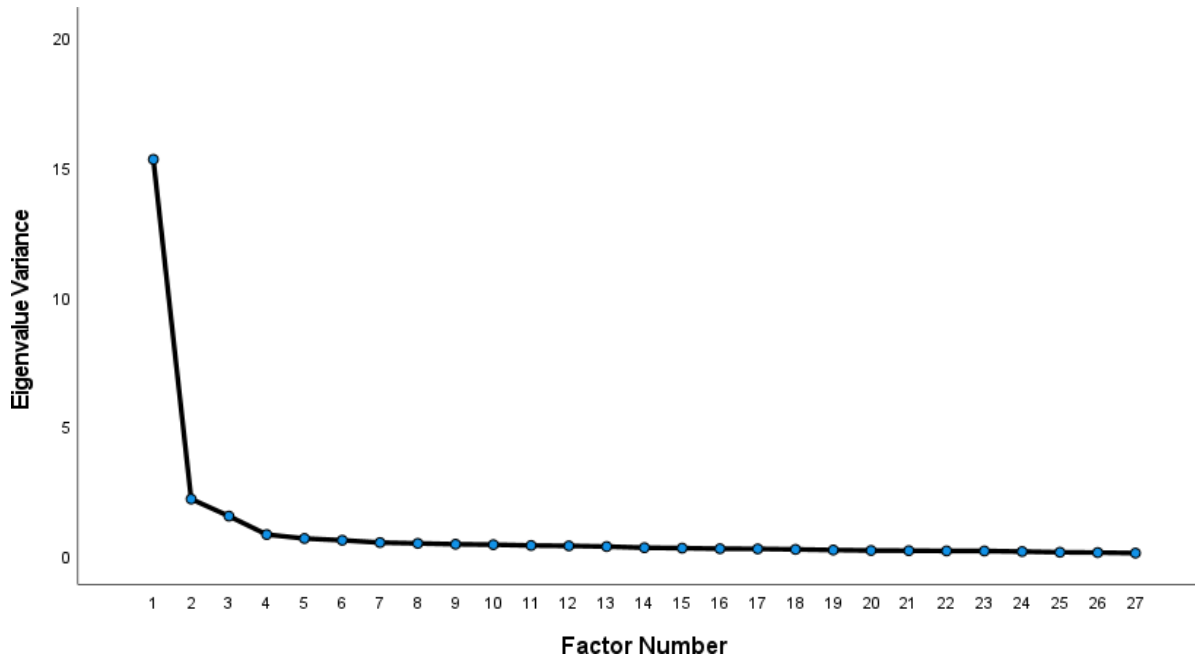


Figure 4. Factor Plot in Rotated Factor Space in Study 1B

