

Professional Identity and Motivation to Study Medicine: A Structural and Cluster Analytic Study among Medical Students

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Abstract

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Background: Professional identity formation (PIF) and motivation are key factors influencing medical students' engagement, well-being, and persistence. While both constructs are well-recognized, limited research has simultaneously explored their interrelationship, psychometric properties, and demographic variations in medical students.

Methods: A cross-sectional study was conducted with **271 undergraduate medical students** from Azra Naheed Medical College, Lahore, Pakistan. Professional identity was assessed using the *Professional Identity Questionnaire* [10], and motivation was measured through Self-Determination Theory (intrinsic, identified, introjected, and external regulation). Data were collected via an online survey. Analyses in **R** included reliability (Cronbach's α , McDonald's ω), confirmatory factor analysis (CFA),

structural equation modeling (SEM), group comparisons (Welch's *t*-tests, ANOVA), correlations, and hierarchical cluster analysis.

Results: Students reported **high positive identity** ($M = 3.70$, $SD = 0.77$) and **autonomous motivation** (intrinsic: $M = 3.46$; identified: $M = 3.65$), alongside **lower controlled motivation** (introjected: $M = 2.92$; external: $M = 2.98$). All scales showed

good reliability ($\alpha = .73-.90$). CFA supported a two-factor structure for identity and a four-factor model for motivation. SEM demonstrated that **positive identity predicted intrinsic ($\beta = .43, p < .001$) and identified motivation ($\beta = .51, p < .001$)**, while disidentification was positively linked to controlled motives. Group comparisons revealed significant effects of gender, employment status, parental marital status, and family type. Cluster analysis identified four distinct identity-motivation profiles, ranging from “Low Identity/Motivation” to “Very High Identity & Autonomous.”

Conclusion: Professional identity strongly predicts autonomous motivation in medical students, while disidentification aligns with controlled regulation. Demographic factors and subgroup profiles highlight the heterogeneous nature of students’ experiences. Educational strategies that **strengthen professional identity** and **support autonomy** may foster engagement, resilience, and well-being in medical training.

Introduction

Professional identity formation (PIF) has become a central focus in medical education, describing how students integrate the values, norms, and roles of the profession into their sense of self. Recent studies highlight that PIF is shaped not only by formal curricula but also by clinical experiences, peer interactions, and implicit social learning, emphasizing its complex and dynamic nature [1,2]. A strong professional identity is associated with greater engagement and resilience, while experiences of mistreatment or identity conflict may undermine students’ sense of belonging and professional commitment [3].

Motivation is another key factor influencing medical students’ learning and persistence. Self-determination theory (SDT) distinguishes between autonomous motivation (intrinsic enjoyment and identified personal value) and controlled motivation (introjected obligation and external pressure). Recent research shows that autonomous motivation is linked to deeper learning, self-regulation, and psychological well-being, whereas controlled motivation is often associated with stress and less adaptive outcomes [4,5,6]. For example, a recent multicenter study reported that medical students tend to endorse intrinsic and identified motives more strongly than controlled motives [6].

Emerging evidence suggests that professional identity and motivation are closely interrelated. Students with stronger professional identity report higher motivation for medical school [7], and motivation-opportunity-ability models indicate that motivational resources and contextual affordances shape occupational identity, underscoring a bidirectional relationship between these constructs [8]. Contemporary theory further reconceptualizes PIF as a process balancing belonging, agency, and critical engagement with professional norms, which likely influences motivational orientations [9].

Despite these advances, few studies have simultaneously examined professional identity, SDT-based motivation, and demographic influences in diverse contexts, or profiled identity-motivation subgroups within cohorts [6]. The present study addresses these gaps by (1) evaluating the reliability and validity of professional identity and motivation measures, (2) testing their factor structures via confirmatory factor analysis (CFA), (3) modeling predictive relationships between identity and motivation using structural equation modeling (SEM), (4) examining demographic differences, and (5) identifying student subgroups through cluster analysis. By integrating psychometric, correlational, and person-centered approaches, this study advances understanding of how professional identity shapes medical students’ motivation and informs curriculum design and student support.

Methods

Study Design and Participants

This cross-sectional study was conducted among undergraduate medical students at [Institution]. A total of **271 students** participated ($M_{\text{age}} = 21.79$ years, $SD = 1.42$; range = 18-28). The sample included 65.3% females and 34.7% males; most were in the fourth year (59.0%). Participation was voluntary and anonymous with electronic informed consent.

Measures

Professional Identity

Professional identity was assessed with the **Professional Identity Questionnaire (PIQ)** validated for medical students [10]. The PIQ captures *positive professional identity* and *disidentification* using parallel agreement and frequency subscales. Items were rated on a **5-point Likert scale** (1 = strongly disagree/never to 5 = strongly agree/always).

Motivation to Study Medicine

Motivation was measured with **SDT-based subscales** assessing four regulatory styles: **intrinsic**, **identified**, **introjected**, and **external**. Each subscale contained four items rated on a **5-point Likert scale** (1 = strongly disagree to 5 = strongly agree). These measures have demonstrated acceptable validity and reliability in health-professions education, including medical cohorts [7,11].

Demographic and Background Variables

Students reported age, gender, academic year, socioeconomic status, family type, parental marital status, accommodation, geographical background, employment status, smoking behavior, extracurricular involvement, study preference, daily phone use, physical activity level, and primary means of transportation.

Procedure

Data were collected via a **structured online questionnaire** distributed through [institutional channels]. The survey required approximately 15-20 minutes to complete. No incentives were provided.

Statistical Analyses

All analyses were conducted in **R studio 4.5.1**.

Data management & descriptives: *tidyverse* [12].

Reliability: Cronbach's α and McDonald's ω via *psych* [13].

CFA & SEM: *lavaan* [14]; model fit via χ^2/df , CFI, TLI, RMSEA, SRMR.

Associations: Pearson's r and Spearman's ρ , as appropriate.

Group comparisons: Welch's t -tests and ANOVAs with Cohen's d / partial η^2 .

Cluster analysis: hierarchical clustering (Ward's method, Euclidean distance) using *cluster* [15]; solutions evaluated with ANOVA and Tukey post-hoc tests.

Two-tailed $p < .05$ denoted statistical significance.

Ethics

The study was approved by the Institutional Review Board of **Azra Naheed Medical College**. Participation was voluntary, informed consent was obtained electronically, and confidentiality and anonymity were ensured.

Results

Sample Characteristics

A total of 271 medical students participated in the study. The mean age was **21.79 years** ($SD = 1.42$, range = 18-28). The sample consisted of **65.3% females** and **34.7%**

males. Most participants were enrolled in the **4th year (59.0%)**, followed by the 3rd year (19.2%), 2nd year (13.7%), 5th year (6.3%), and 1st year (1.8%).

The majority of students lived at home (59.8%) and came from nuclear families (70.1%). Socioeconomic status was predominantly middle-income (76.8%), with 19.6% high-income and 3.7% low-income. Most students resided in urban areas (67.2%), were single (97.8%), and had married parents (94.1%).

Regarding lifestyle and habits, **93.0% were unemployed, 91.1% reported never smoking, and 56.8% participated in extracurricular activities.** The most common study preference was studying alone (70.5%), and the majority reported using their phone **3-5 hours daily (35.4%)**. In terms of physical activity, 48.0% were moderately active, 22.9% lightly active, 15.5% very active, and 13.7% sedentary.

Table 1: Sample Characteristics (N = 271)

Variable	Most Frequent Category	%
Academic Year	4th Year (Sem 7-8)	59.0
Gender	Female	65.3
Accommodation	Home	59.8
Family Type	Nuclear	70.1
Socioeconomic Status	Middle-income	76.8
Geographical Background	Urban	67.2
Marital Status	Single	97.8
Parental Marital Status	Married	94.1
Employment	Unemployed	93.0
Smoking	Never smoked	91.1
Extracurricular	Yes	56.8
Study Preference	Alone	70.5
Phone Use	3-5 hours/day	35.4
Activity Level	Moderately active	48.0
Transport	Personal vehicle	46.9

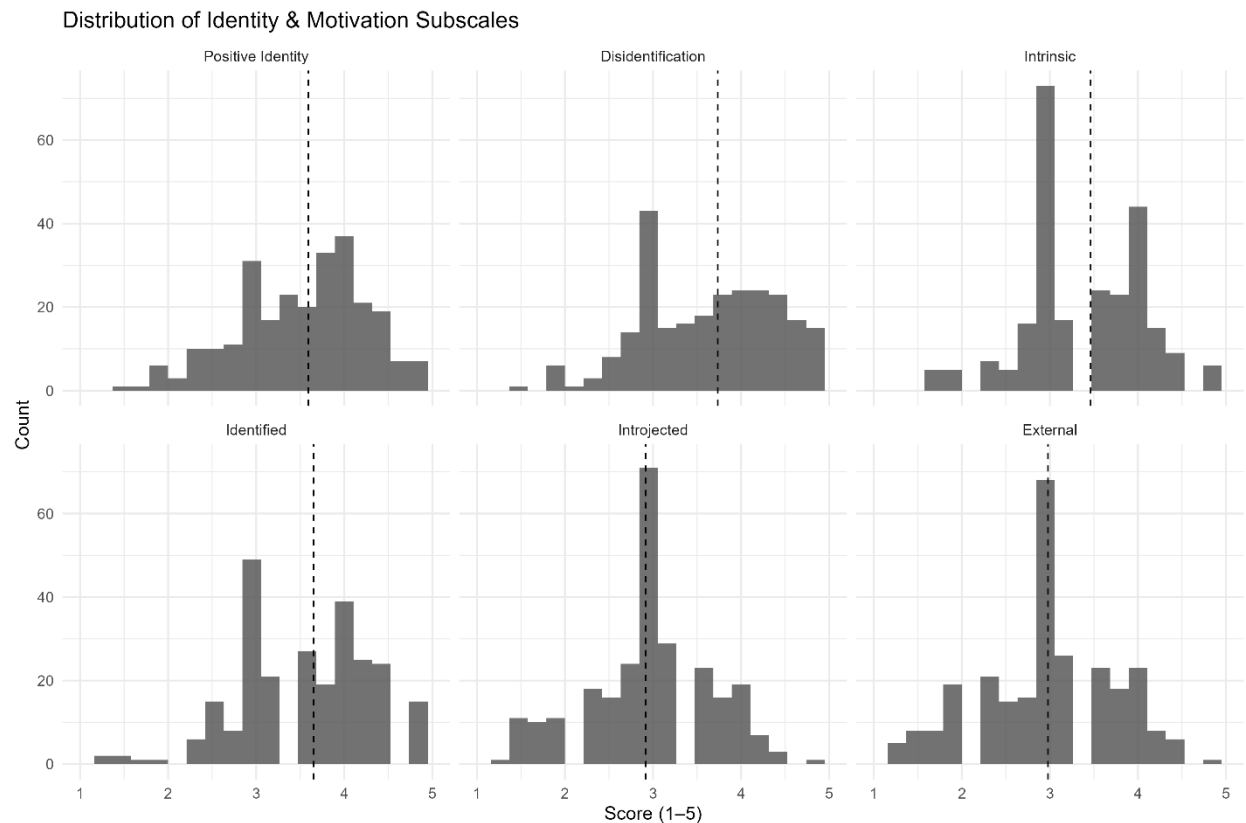
Descriptive Statistics of Main Scales

Descriptive analyses for the study variables are shown in Table 2. Students reported relatively high levels of **positive professional identity (M = 3.70, SD = 0.77)** and **identified motivation (M = 3.65, SD = 0.79)**. Scores for **intrinsic motivation (M = 3.46, SD = 0.81)** and **positive identity frequency (M = 3.48, SD = 0.91)** were moderate. By contrast, **introjected motivation (M = 2.92, SD = 0.79)** and **external motivation (M = 2.98, SD = 0.80)** were lower.

Overall, distributions were approximately normal, with skewness and kurtosis values within acceptable ranges (± 1).

Table 2: Descriptive Statistics of Study Scales (N = 271)

Scale	M	SD	Skew	Kurt	Range
Positive Identity (Agree)	3.70	0.77	-0.24	0.12	1-5
Negative Identity (Reversed)	3.59	0.88	-0.14	-0.21	1-5
Positive Identity (Freq)	3.48	0.91	-0.41	-0.18	1-5
Negative Identity (Reversed, Freq)	3.88	0.89	-0.49	-0.65	1-5
SDT - Intrinsic Motivation	3.46	0.81	-0.19	0.30	1-5
SDT - Identified Motivation	3.65	0.79	-0.27	-0.32	1.2-5
SDT - Introjected Motivation	2.92	0.79	-0.41	0.08	1-5
SDT - External Motivation	2.98	0.80	-0.21	-0.22	1-5



Reliability Analyses

Internal consistency was examined using Cronbach's alpha (α) and McDonald's omega (ω). Results indicated **good to excellent reliability** for all subscales except introjected and external regulation, which showed acceptable reliability. Specifically, **positive professional identity** ($\alpha = .89-.90$, $\omega = .89-.92$) and **identified motivation** ($\alpha = .82$, $\omega = .83-.86$) demonstrated strong internal consistency. **Intrinsic motivation** also showed good reliability ($\alpha = .84$, $\omega = .84-.88$). By contrast, **introjected motivation** ($\alpha = .73$, $\omega = .73-.75$) and **external regulation** ($\alpha = .75$, $\omega = .77-.79$) were somewhat lower but still within acceptable limits.

These results support the reliability of the scales used in this study.

Table 3: Reliability Statistics for Study Scales (N = 271)

Scale	α (Std.)	ω (Total)	g-h	Mean r	Items
Positive Identity (Agree)	.89	.89-.92	.92	.62	5
Negative Identity (Reversed)	.86	.86-.89	.89	.60	4
Positive Identity (Freq)	.88	.88-.90	.90	.59	5
Negative Identity (Rev, Freq)	.85	.85-.89	.89	.53	5
SDT - Intrinsic Motivation	.84	.84-.88	.88	.57	4
SDT - Identified Motivation	.82	.83-.86	.86	.53	4
SDT - Introjected Motivation	.73	.73-.75	.75	.40	4
SDT - External Motivation	.75	.77-.79	.79	.43	4

Construct Validity (Factor Structure)

Confirmatory factor analyses (CFAs) were conducted to test the factor structure of professional identity and motivation to study medicine.

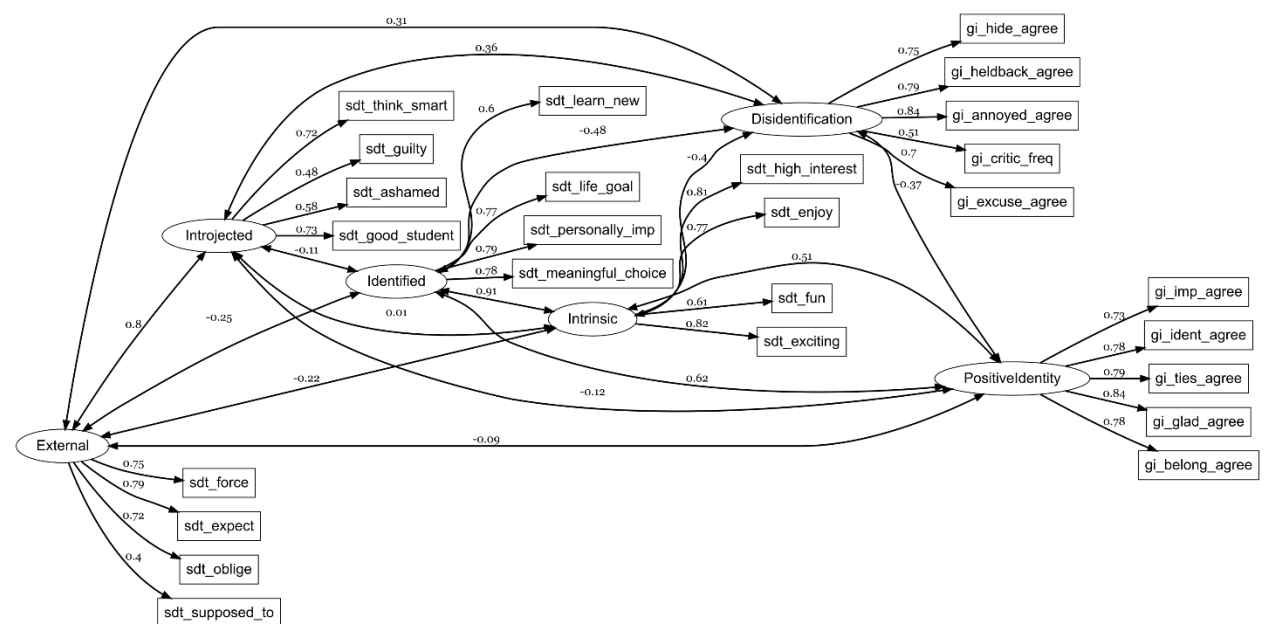
For **professional identity**, a two-factor solution (positive identity and disidentification) showed acceptable model fit: $\chi^2/df = 4.18$, CFI = .94, TLI = .91, RMSEA = .11, SRMR = .04.

For **motivation**, the hypothesized **four-factor SDT model** (intrinsic, identified, introjected, external) provided a better fit than a one-factor alternative. The four-factor model yielded $\chi^2/df = 2.65$, CFI = .91, TLI = .89, RMSEA = .08, SRMR = .06, whereas the one-factor model showed poor fit ($\chi^2/df = 8.55$, CFI = .58, TLI = .52, RMSEA = .17, SRMR = .17).

These findings support the distinctiveness of identity and motivation dimensions.

Table 4: CFA Model Fit Indices

Model	χ^2/df	CFI	TLI	RMSEA	SRMR
Identity (2-factor)	4.18	.936	.911	.108	.043
SDT (4-factor)	2.65	.914	.894	.078	.064
SDT (1-factor)	8.55	.581	.517	.167	.169



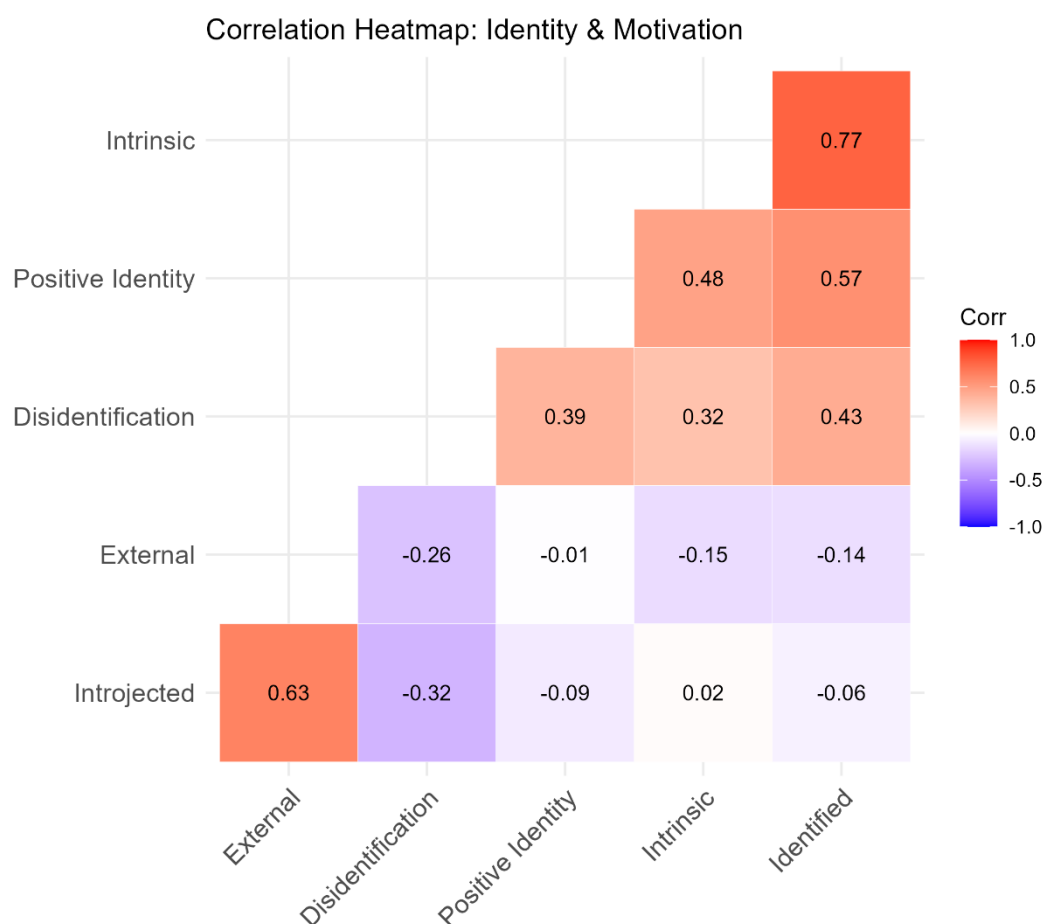
Correlational Analysis

Table 5 presents Pearson correlations among the main study variables. As expected, **positive identity was strongly and positively correlated with intrinsic motivation ($r = .48$, $p < .001$) and identified motivation ($r = .57$, $p < .001$)**. Disidentification was positively related to controlled forms of motivation, including introjected ($r = .32$, $p < .001$) and external regulation ($r = .26$, $p < .001$).

Notably, introjected and external motivation were negatively or nonsignificantly associated with intrinsic and identified motivation. Spearman correlations yielded a highly similar pattern of results.

Table 5: Correlation Matrix of Study Variables (Pearson r)

Variable	1	2	3	4	5	6
1. Identity (Positive)	1.00***					
2. Disidentification	.39***	1.00***				
3. SDT: Intrinsic	.48***	.32***	1.00***			
4. SDT: Identified	.57***	.43***	.77***	1.00***		
5. SDT: Introjected	-.09	-.32***	.02	-.06	1.00***	
6. SDT: External	-.01	-.26***	-.15*	-.14*	.63***	1.00***



Structural Equation Modeling (SEM)

To test predictive relationships, SEM was conducted with identity dimensions predicting types of motivation.

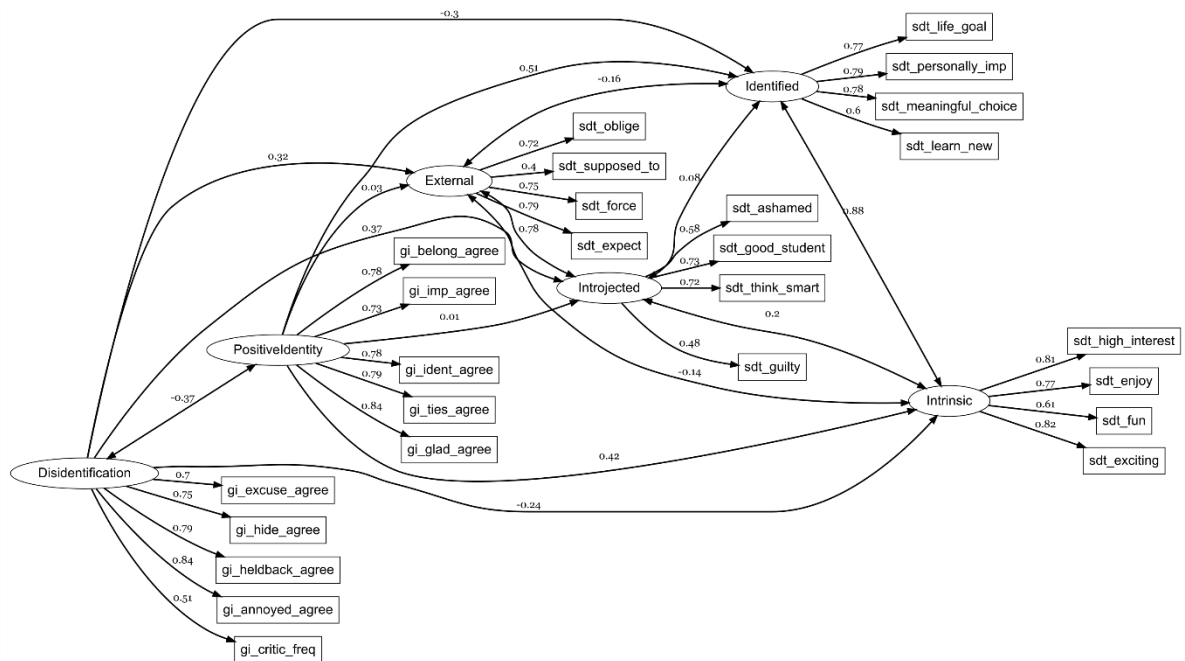
Results showed that **positive identity significantly predicted intrinsic motivation** ($\beta = .43$, $p < .001$) and **identified motivation** ($\beta = .51$, $p < .001$), but had no significant effect on introjected or external regulation.

Conversely, **disidentification positively predicted intrinsic** ($\beta = .24$, $p = .001$) and **identified motivation** ($\beta = .29$, $p < .001$), but negatively predicted introjected ($\beta = -.36$, $p < .001$) and external regulation ($\beta = -.32$, $p < .001$).

Overall, identity dimensions explained **31.3% of the variance in intrinsic motivation and 45.9% in identified motivation**, while variance explained was lower for introjected (12.7%) and external regulation (9.8%).

Table 6: SEM Results: Identity Predicting Motivation

DV (Motivation)	Predictor	β (Std.)	SE	z	p	R ²
Intrinsic	Positive Identity	.426	.11	4.66	<.001	.313
	Disidentification	.240	.09	3.29	.001	
Identified	Positive Identity	.514	.13	5.39	<.001	.459
	Disidentification	.293	.11	3.77	<.001	
Introjected	Positive Identity	.009	.08	0.12	.907	.127
	Disidentification	-.360	.09	-4.40	<.001	
External	Positive Identity	.026	.09	0.31	.758	.098
	Disidentification	-.321	.09	-3.94	<.001	



Group Comparisons

Welch's t-tests and ANOVAs were conducted to explore differences in **identity and motivation scores** across demographic groups.

Significant Findings

Employment status

Positive Identity: Unemployed students scored higher ($M = 3.63$, $SD = 0.75$) than employed students ($M = 3.04$, $SD = 0.83$), $t(20.3) = -3.02$, $p = .007$, Cohen's $d = -0.78$.
 Disidentification: Unemployed students scored higher ($M = 3.77$, $SD = 0.81$) than employed students ($M = 3.33$, $SD = 0.66$), $t(22.3) = -2.74$, $p = .012$, Cohen's $d = -0.55$.

Gender

Disidentification: Females reported higher levels ($M = 3.85$, $SD = 0.76$) than males ($M = 3.52$, $SD = 0.85$), $t(172.7) = 3.14$, $p = .002$, Cohen's $d = 0.41$.
 Identified motivation: Females scored higher ($M = 3.75$, $SD = 0.78$) than males ($M = 3.48$, $SD = 0.80$), $t(184.5) = 2.67$, $p = .008$, Cohen's $d = 0.34$.
 Intrinsic motivation: Females scored higher ($M = 3.56$, $SD = 0.81$) than males ($M = 3.27$, $SD = 0.77$), $t(197) = 2.88$, $p = .004$, Cohen's $d = 0.36$.
 External motivation: Males scored higher ($M = 3.19$, $SD = 0.75$) than females ($M = 2.87$, $SD = 0.81$), $t(202.9) = -3.30$, $p = .001$, Cohen's $d = -0.41$.

Parental marital status

Disidentification: Students with separated parents reported lower scores ($M = 3.25$, $SD = 0.71$) than those with married parents ($M = 3.77$, $SD = 0.80$), $t(17.5) = 2.79$, $p = .012$, Cohen's $d = 0.65$.
 Identified motivation: Students with separated parents also scored lower ($M = 3.22$, $SD = 0.61$) compared to those with married parents ($M = 3.68$, $SD = 0.80$), $t(18.4) = 2.86$, $p = .010$, Cohen's $d = 0.59$.

Family type

Introjected motivation: Students from joint families ($M = 3.12$, $SD = 0.79$) reported higher scores than those from nuclear families ($M = 2.83$, $SD = 0.78$), $t(149.4) = 2.83$, $p = .005$, Cohen's $d = 0.38$.

Table 7: Significant Group Differences

Variable	Grouping	Comparison	Test	<i>t</i> / <i>F</i>	df	<i>p</i>	Effect size
Positive Identity	Employment status	Unemployed > Employed	Welch t-test	-3.02	20.3	.007	<i>d</i> = -0.78
Disidentification	Employment status	Unemployed > Employed	Welch t-test	-2.74	22.3	.012	<i>d</i> = -0.55
Disidentification	Gender	Female > Male	Welch t-test	3.14	172.7	.002	<i>d</i> = 0.41
Identified Motivation	Gender	Female > Male	Welch t-test	2.67	184.5	.008	<i>d</i> = 0.34
Intrinsic Motivation	Gender	Female > Male	Welch t-test	2.88	197.0	.004	<i>d</i> = 0.36
External Motivation	Gender	Male > Female	Welch t-test	-3.30	202.9	.001	<i>d</i> = -0.41
Disidentification	Parental marital status	Married > Separated	Welch t-test	2.79	17.5	.012	<i>d</i> = 0.65
Identified Motivation	Parental marital status	Married > Separated	Welch t-test	2.86	18.4	.010	<i>d</i> = 0.59
Introjected Motivation	Family type	Joint > Nuclear	Welch t-test	2.83	149.4	.005	<i>d</i> = 0.38

Group comparisons revealed several significant demographic differences in professional identity and motivation to study medicine.

Students' **employment status** was associated with identity: unemployed students reported stronger **positive identity** ($M = 3.63$ vs. 3.04) and lower **disidentification** ($M = 3.77$ vs. 3.33) compared to employed peers, with medium to large effects ($d = -0.78, -0.55$).

Gender differences also emerged. Female students reported higher levels of **disidentification** ($M = 3.85$ vs. 3.52), **identified motivation** ($M = 3.75$ vs. 3.48), and **intrinsic motivation** ($M = 3.56$ vs. 3.27) compared to males. Conversely, males endorsed higher **external regulation** ($M = 3.19$ vs. 2.87). Effect sizes were small to medium ($d = 0.34-0.41$).

Regarding **parental marital status**, students with married parents scored higher on **identified motivation** ($M = 3.68$ vs. 3.22) and reported less **disidentification** ($M = 3.77$ vs. 3.25) than those with separated parents, with medium effect sizes ($d = 0.59-0.65$).

Finally, **family type** was associated with **introjected motivation**, with students from joint family systems reporting higher scores ($M = 3.12$ vs. 2.83) than those from nuclear families ($d = 0.38$).

Cluster Analysis

A hierarchical cluster analysis (Ward's method, Euclidean distance) suggested a four-cluster solution, consistent with the parallel analysis. Clusters differed significantly on all identity and motivation subscales (all $ps < .001$). Table 8 reports means, SDs, and ANOVA results.

Cluster 1 (n=101; “Low Motivation/Identity”): Scored lowest across positive identity, intrinsic, and identified motives ($M \approx 3.0$), suggesting disengagement.

Cluster 2 (n=84; “Mixed High External/Introjected”): Moderate-to-high scores on positive identity and motivation, but particularly elevated introjected ($M = 3.48$) and external regulation ($M = 3.53$).

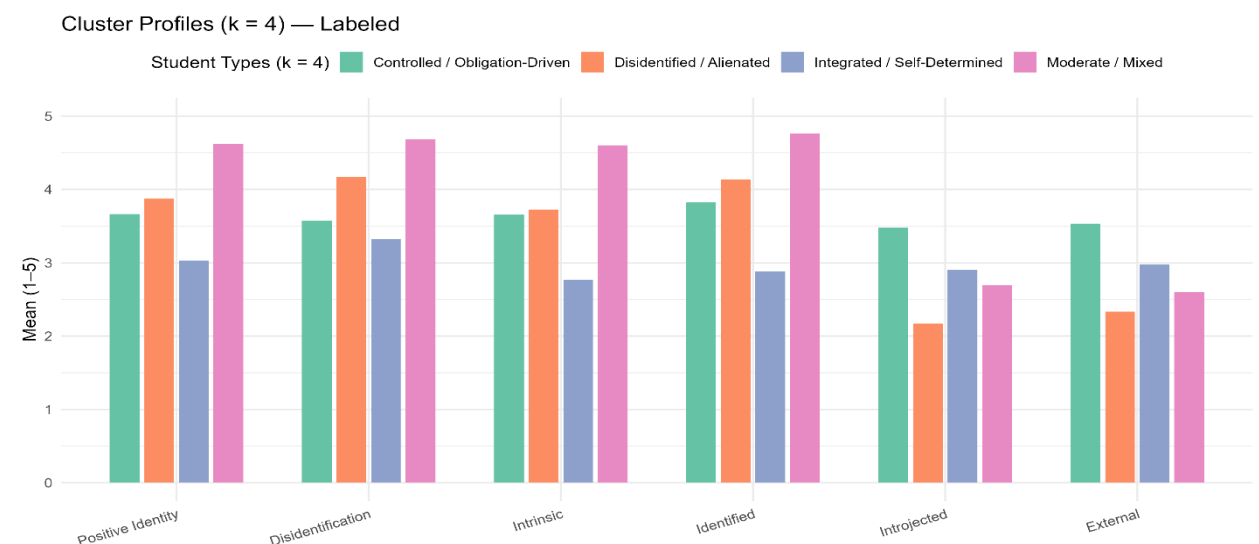
Cluster 3 (n=51; “High Identity, Low Controlled”): Strong positive identity and identified motivation ($M \approx 4.1$), paired with relatively low introjected ($M = 2.17$) and external ($M = 2.33$).

Cluster 4 (n=35; “Very High Identity & Autonomous”): Reported the highest positive identity ($M = 4.62$) and autonomous motivation (intrinsic $M = 4.60$; identified $M = 4.76$).

Figure 5 shows bar plots of cluster means across subscales. Post-hoc Tukey comparisons confirmed that Clusters 3 and 4 were significantly higher in intrinsic and identified motivation compared to Clusters 1 and 2, whereas Cluster 2 was uniquely elevated in introjected and external regulation.

Table 8 (Cluster ANOVA summary)

Scale	Cluster 1 (n=101)	Cluster 2 (n=84)	Cluster 3 (n=51)	Cluster 4 (n=35)	F	p
Positive Identity	3.03 (.64)	3.66 (.60)	3.87 (.50)	4.62 (.37)	74.31	< .001
Disidentification	3.32 (.62)	3.57 (.84)	4.17 (.51)	4.68 (.34)	47.20	< .001
Intrinsic Motive	2.77 (.57)	3.66 (.46)	3.73 (.57)	4.60 (.50)	120.00	< .001
Identified Motive	2.88 (.51)	3.82 (.43)	4.14 (.42)	4.76 (.26)	202.00	< .001
Introjected	2.90 (.51)	3.48 (.48)	2.17 (.65)	2.69 (1.15)	45.09	< .001
External	2.98 (.62)	3.53 (.56)	2.33 (.64)	2.60 (1.05)	39.93	< .001



Discussion

Overview of Findings

Students reported **high positive professional identity** and **autonomous motivation** (intrinsic, identified), with **lower controlled motivation** (introjected, external). CFA supported the multidimensional structures of identity and motivation, and SEM showed that professional identity particularly positive identity predicted autonomous motivation. Demographic comparisons and person-centered analyses revealed meaningful variability, including distinct identity-motivation profiles.

Professional Identity and Autonomous Motivation

The strong prediction of **intrinsic and identified motivation** by positive identity aligns with recent evidence in first-year medical students [7] and with models indicating that motivation, ability, and opportunity shape occupational identity in reciprocal ways [8]. These converging findings suggest that strengthening professional identity can bolster autonomous motivation, sustaining engagement and persistence.

Notably, **disidentification** in our data showed a nuanced pattern positively (albeit more weakly) related to autonomous motives but negatively related to controlled regulation consistent with qualitative work portraying identity development as involving reflexivity and evolving self-conception in clinical training [1].

Controlled Motivation and Disidentification

As expected, **introjected and external regulation** tracked more closely with disidentification. Contemporary work links controlled profiles with less adaptive psychological outcomes compared to autonomous profiles [6]. This underscores the importance of autonomy-supportive educational contexts that minimize unnecessary external pressures and nurture internalization of values [4].

Group Differences

Context mattered:

Employment: Unemployed students showed stronger identity and lower disidentification than employed peers consistent with the idea that competing work demands can dilute identification with the medical role.

Gender: Females reported higher intrinsic and identified motivation (as in [7]) yet also higher disidentification, pointing to possible gendered socialization or stressors within training environments.

Parental marital status: Students with married parents reported stronger identity and identified motivation than those with separated parents, suggesting a supportive family milieu may aid identity formation.

Family type: Joint families were associated with higher introjected motivation, possibly reflecting internalized expectations from extended family systems. These patterns reinforce that identity and motivation are socioculturally embedded phenomena [1,6].

Motivational Profiles

Cluster analysis yielded four subgroups from **Low Identity/Motivation** to **Very High Identity & Autonomous**. The heterogeneity echoes recent profiling work in medical

cohorts [6] and extends it by linking profiles explicitly to professional identity students with stronger identity clustered in more autonomous, adaptive profiles.

Educational Implications

Identity-centered curricula: Mentorship, role modeling, and structured reflection can strengthen identity [1].

Autonomy-supportive teaching: Reduce undue external pressures and foster self-regulated learning to limit controlled motivation and support well-being [4,5].

Tailored support: Consider gender, family context, and employment status when designing student support.

Use profiles to target support: Identify disengaged or controlled-leaning students early and offer targeted interventions toward autonomous regulation.

Limitations and Future Directions

The **cross-sectional** design limits causal inference; **self-report** may introduce bias; and a single-institution sample limits generalizability. Future work should deploy **longitudinal, cross-cultural** designs to chart identity-motivation co-development and evaluate curricular interventions aimed at strengthening identity and sustainable autonomous motivation [8]. Person-centered approaches can track movement between profiles across training stages [6].

Conclusion

Professional identity emerged as a central predictor of medical students' motivational orientations. Stronger positive identity was associated with **higher intrinsic and identified motivation**, whereas disidentification related to greater reliance on **controlled regulation**. These results extend recent evidence linking identity and motivation in medical education [7,8] and align with contemporary profiling showing heterogeneity in students' motivational patterns [6]. Given sociocultural influences on identity and motivation [1,6], curricula should be both **identity-centered** and **autonomy-supportive**, leveraging reflection, mentoring, and role modeling to foster internalization while minimizing unnecessary external pressures to protect well-being and learning quality [4,5]. Future **longitudinal, cross-cultural** studies are warranted to map trajectories and test targeted interventions that promote robust identity formation and durable autonomous motivation [8].

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Consent to Participate

Statement	Response
I consent to participate in the research study. I understand the purpose of the study. I am aware that my participation is voluntary, and I can withdraw at any time without penalty. I understand that my data will be treated confidentially and used for research purposes only. By providing my consent, I acknowledge that I have been given the opportunity to ask questions and have received satisfactory answers.	☐ Yes ☐ No

Demographic Information

Question	Response Options
Age	☐ 18 ☐ 19 ☐ 20 ☐ 21 ☐ 22 ☐ 23 ☐ 24 ☐ 25 ☐ 26 ☐ 27 ☐ 28
Academic Year	☐ 1st Year (Sem 1 & 2) ☐ 2nd Year (Sem 3 & 4) ☐ 3rd Year (Sem 5 & 6) ☐ 4th Year (Sem 7 & 8) ☐ 5th Year (Sem 9 & 10)
Gender	☐ Male ☐ Female
Family Type	☐ Joint Family System ☐ Nuclear Family System
Nationality	☐ Pakistani ☐ Overseas
Marital Status	☐ Single ☐ Married ☐ Divorced ☐ Widowed
Type of Accommodation	☐ Hostel ☐ Home
Employment Status	☐ Employed ☐ Unemployed
Socioeconomic Status	☐ Low-income ☐ Middle-income ☐ High-income
Geographical Background	☐ Urban ☐ Suburban ☐ Rural
Monthly Pocket Money (PKR)	☐ <15,000 ☐ 16,000-30,000 ☐ 31,000-45,000 ☐ 46,000-60,000 ☐ >60,000
Do you have any chronic health conditions?	☐ Yes ☐ No
Smoking Habit	☐ Never Smoked ☐ Ex-Smoker ☐ Current Smoker
Household Size	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10+
Transportation to School	☐ Walk ☐ Bicycle ☐ Public Transport ☐ Personal Vehicle ☐ Carpool
Extracurricular Activities?	☐ Yes ☐ No
Study Preference	☐ Alone ☐ In a Group ☐ With a Tutor

Parent	Education Level	Occupation
Mother	☐ PhD ☐ University ☐ Master's ☐ Secondary ☐ Diploma ☐ No formal education	☐ Business ☐ Professional ☐ Skilled Trade ☐ Service ☐ Sales ☐ Education ☐ Unemployed ☐ Retired ☐ House wife
Father	☐ PhD ☐ University ☐ Master's ☐ Secondary ☐ Diploma ☐ No formal education	☐ Business ☐ Professional ☐ Skilled Trade ☐ Service ☐ Sales ☐ Education ☐ Unemployed ☐ Retired ☐ House Husband
Parental Marital Status	☐ Married ☐ Divorced ☐ Separated	
Who has control over kids in your home?	☐ Mother ☐ Father	

Question	Response Options
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How long do you use your phone daily?	☐ Less than 1 hour ☐ 1-3 hours ☐ 3-5 hours ☐ 5-7 hours ☐ More than 7 hours
Social media accounts you have	☐ Facebook ☐ Instagram ☐ LinkedIn ☐ Pinterest ☐ Snapchat ☐ Other: _____
Social Media Usage	☐ Several times/day ☐ Once/day ☐ Few times/week ☐ Rarely
Primary Entertainment Source	☐ Streaming Services (Netflix, Hulu, etc.) ☐ Video Games ☐ Social Media ☐ Books/Magazines ☐ Sports/Outdoor Activities
Overall Activity Level	☐ Very Active ☐ Moderately Active ☐ Lightly Active ☐ Sedentary

Personal Identity and Motivation to Study Medicine

Statement	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
A. I am a person who considers the doctors' group important.	☐	☐	☐	☐	☐
B. I am a person who identifies with the doctors' group.	☐	☐	☐	☐	☐
C. I am a person who feels strong ties with the doctors' group.	☐	☐	☐	☐	☐
D. I am a person who is glad to belong to the doctors' group.	☐	☐	☐	☐	☐
E. I am a person who sees myself belonging to the doctors' group.	☐	☐	☐	☐	☐
F. I am a person who makes excuses for belonging to the doctors' group.	☐	☐	☐	☐	☐
G. I am a person who tries to hide belonging to the doctors' group.	☐	☐	☐	☐	☐
H. I am a person who feels held back by the doctors' group.	☐	☐	☐	☐	☐
I. I am a person who is annoyed to say that I'm a member of the doctors' group.	☐	☐	☐	☐	☐
J. I am a person who would feel guilty for not belonging to the doctors' group.	☐	☐	☐	☐	☐

Why are you studying medicine? I am studying...	Completely not important (1)	Rather not important (2)	Neutral (3)	Important (4)	Very important (5)
1) ... because I want to learn new things.	☐	☐	☐	☐	☐
2) ... because I would feel guilty if I wouldn't do so.	☐	☐	☐	☐	☐
3) ... because I'm supposed to do so.	☐	☐	☐	☐	☐
4) ... because I enjoy studying medicine.	☐	☐	☐	☐	☐
5) ... because this is an important life goal to me.	☐	☐	☐	☐	☐
6) ... because studying medicine is an exciting thing to do.	☐	☐	☐	☐	☐
7) ... because I would feel ashamed if I wouldn't do so.	☐	☐	☐	☐	☐
8) ... because others (parents, friends, etc.) oblige me to do so.	☐	☐	☐	☐	☐
9) ... because I want others to think I'm a good student.	☐	☐	☐	☐	☐
10) ... because studying medicine is fun.	☐	☐	☐	☐	☐
11) ... because studying medicine is personally important to me.	☐	☐	☐	☐	☐
12) ... because this represents a meaningful choice to me.	☐	☐	☐	☐	☐
13) ... because that's what others (parents, friends, etc.) expect me to do.	☐	☐	☐	☐	☐
14) ... because I am highly interested in studying medicine.	☐	☐	☐	☐	☐
15) ... because that's something others (parents, friends,	☐	☐	☐	☐	☐

etc.) force me to do.					
16) ... because I want others to think I'm smart.	○	○	○	○	○