TPM Vol. 32, No. S8, 2025
ISSN: 1972-6325
https://www.tpmap.org/

EXPERIENCES AND COPING STRATEGIES OF WARM-CLIMATE INTERNATIONAL STUDENTS ADAPTING TO COLD WEATHER IN MOSCOW: A QUALITATIVE STUDY

*SYED GUFRAN SADIQ ZAIDI
NAZARBAYEV UNIVERSITY, KAZAKHSTAN.EMAIL: sgsz0347@outlook.com

LIZA ORAZMUKHAMETOVA
NAZARBAYEV UNIVERSITY, KAZAKHSTAN. EMAIL: liza.shyn358@gmail.com

SYEDA KISA ZAHRA
BARANI INSTITUTE OF SCIENCES SAHIWAL CAMPUS, JV OF PMAS ARID AGRICULTURE UNIVERSITY RAWALPINDI. kisazahra78682@gmail.com

ZEESHAN HAIDER
NATIONAL RESEARCH UNIVERSITY HIGHER SCHOOL OF ECONOMICS (HSE UNIVERSITY), MOSCOW EDUCATIONAL LABORATORY OF COGNITIVE RESEARCH. EMAIL: zeesshaaan@outlook.com

SAMINA MUSTAFA
M.PHIL SCHOLAR, DEPARTMENT OF EDUCATION, PMAS, ARID AGRICULTURE UNIVERSITY RAWALPINDI. EMAIL: saminamustafa68@gmail.com

SOHAIL AHMAD
M.PHIL. ENGLISH LINGUISTICS. SSE ENGLISH SCHOOL EDUCATION DEPARTMENT (SED), GOVT. OF PUNJAB, PAKISTAN. EMAIL: ahmad.sohail664@gmail.com ORCID ID: https://orcid.org/0000-0001-8710-3237

Abstract

As global mobility brings students from tropical regions to harsh winter climates, understanding adaptation processes is critical for human well-being and rights. This qualitative study examines how 14 international students from warm-climate countries (Nigeria, Pakistan, Egypt, India, Bangladesh, Kenya, Ghana, Sudan, Sri Lanka, Brazil, Indonesia, Ethiopia, Philippines, Saudi Arabia) experience and cope with Moscow's extreme winters. Grounded in Berry's acculturation theory and Bronfenbrenner's ecological systems framework, we conducted semi-structured interviews exploring physical, psychological, and social adaptation**.** Participants (aged 21–29; 7 male, 7 female) living in Moscow for 6–24 months were recruited via purposive sampling and interviewed in English with ethical adherence to the Helsinki Declaration (informed consent, confidentiality, minimal harm, scientific integrity). Transcripts were analyzed using thematic analysis (Braun & Clarke, 2006), with inductive coding of recurring themes. Most participants reported climate shock on arrival: subzero temperatures, snow, and short daylight hours caused physical discomfort (joint pain, headaches, respiratory colds) and mood disturbances. Female students often felt more vulnerable outdoors and struggled with winter-specific hygiene (e.g. skin dryness), while males described acute initial shock (e.g. "walking in -25°C felt like walking into a freezer"). The mental health impact was marked: symptoms of low mood, irritability, and fatigue were common, consistent with winter-pattern Seasonal Affective Disorder. Participants described acculturative stress that included not only language/cultural barriers but also environmental stress (cold unfamiliarity), echoing findings that higher acculturative stress correlates with depression and anxiety. Coping strategies fell into several categories (Table 2): behavioral (layered thermal clothing, use of saunas or indoor exercise, high-calorie diets, vitamin D supplements), social/institutional (support from peer networks, mentorship by local students, university orientation programs on winter preparedness), and cognitive/emotional (maintaining optimism, staying connected with family by video-call). Social support and tailored university services (e.g. peer-mentor groups, counseling) were cited as critical buffers, aligning with evidence that strong support networks significantly reduce acculturative stress. Many adopted integration strategies (Berry, 1997) by engaging both their heritage and Russian cultures (e.g. joining student clubs while observing Russian winter holidays), which literature suggests promotes better adaptation. International students from warm climates face unique challenges in cold environments that affect

TPM Vol. 32, No. S8, 2025
ISSN: 1972-6325
https://www.tpmap.org/

Open Access

their health and rights to safety and well-being. Institutions should proactively provide climate orientation (e.g. guidance on clothing, heating, and nutrition) and expand mental health resources before and during winter. Policies that view adaptation as part of students' human rights can promote equity and resilience. Future research should quantify health outcomes (e.g. vitamin D levels, depression scales) and test interventions.

Key Words: Cold climate adaptation, International students, Coping mechanisms, Gender-specific challenges, Health and well-being

1. INTRODUCTION

With globalization, more students from tropical regions are studying in northern universities. Russia, and Moscow in particular, hosts many international students whose home climates (often 25–35°C year-round) contrast starkly with winter lows around –20°C and heavy snowfall. Unlike intra-hemispheric migration or climate-related displacement, these students move voluntarily for education but must contend with extreme environmental change (Rai, 2025). Yet little research has focused on how newcomers from warm countries adapt to subarctic conditions. Most existing literature on international students emphasizes cultural and academic integration (e.g., language barriers, classroom norms) (Soufi Amlashi et al., 2024). Fewer studies address environmental adaptation, i.e. the physical and psychological responses to extreme cold.

Research indicates that sudden cold exposure can weaken immune defenses (Cold Exposure and Immune Function, 1998), increase cardiovascular strain (Mäkinen et al., 2018), and trigger mood disturbances (Cianconi et al., 2020), with prolonged exposure linked to seasonal health risks like fatigue (Kazi et al., 2025). Warm-climate international students, lacking prior acclimatization, face compounded vulnerabilities, including Seasonal Affective Disorder (SAD) from reduced sunlight and serotonin depletion (Penckofer et al., 2010). Abrupt environmental and cultural transitions further strain integration—critical for psychological well-being (Berry, 1997; Nguyen & Benet-Martínez, 2013)—as evidenced by Zaidi et al. (2025), who found homesickness and fragmented social ties correlate with poor mental health and sleep disruptions. This study examines Moscow's warm-climate students through a human rights lens, positing that equitable access to climate adaptation resources (e.g., winter preparedness programs, mental health support) aligns with rights to health, education, and non-discrimination amid intersecting environmental and acculturative stressors.

We draw on Bronfenbrenner's ecological systems theory and Berry's acculturation framework to analyze findings. Bronfenbrenner posits that individual adaptation is shaped by nested environments: the microsystem (personal factors, family, peers), mesosystem (university, community), and macrosystem (cultural norms, institutional policies). International students uniquely span two ecologies – their homeland and Russia – simultaneously influencing their experience (Tong & An, 2024). Berry's model describes migrants' strategies in a new culture: integration (maintaining heritage culture while engaging host culture), assimilation, separation, or marginalization (Berry, 1997). Prior research finds that integration—building social ties in the host culture without forsaking one's origin—often yields the most positive psychological outcomes (Berry, 1997; Nguyen & Benet-Martínez, 2013). We hypothesize that students who connect with local peers and learn coping strategies will adjust better to Moscow's climate.

This qualitative study explores the lived experiences of 14 international students from warm countries living in Moscow. We investigate (1) the physical and mental health impacts of the cold transition, (2) gender-specific challenges, (3) the coping and support strategies used, and (4) the roles of family, peers, and institutions. This evidence will inform universities' responsibility to support a diverse student body facing environmental extremes.

2. THEORETICAL FRAMEWORK

We integrate Bronfenbrenner's ecological model (1979) and Berry's acculturation theory (1997, 2006) to frame environmental adaptation. Bronfenbrenner emphasized that personal development occurs within multiple interrelated systems. For international students, their microsystem includes their own coping skills, health behaviors, and immediate social circle (roommates, classmates, host families). The mesosystem involves interactions between these microsystems – for example, how family in their home country interacts with peers in Moscow via social media, or how the university's international office connects with housing services. The exosystem encompasses institutional settings like university policies and city infrastructure (e.g. heating, transportation policies for winter). The macrosystem covers broader cultural values (Russian winter norms, attitudes toward foreigners) and economic factors (healthcare access, cost of winter gear). Our findings will reflect how factors at each level shape adaptation. Garton et al. (2021) propose that international students exist across overlapping ecologies of home and host contexts; this notion guided our exploration of how participants' origin climate (e.g., tropical) and Moscow's Arctic climate exert influence simultaneously.

TPM Vol. 32, No. S8, 2025
ISSN: 1972-6325
https://www.tpmap.org/

Open Access

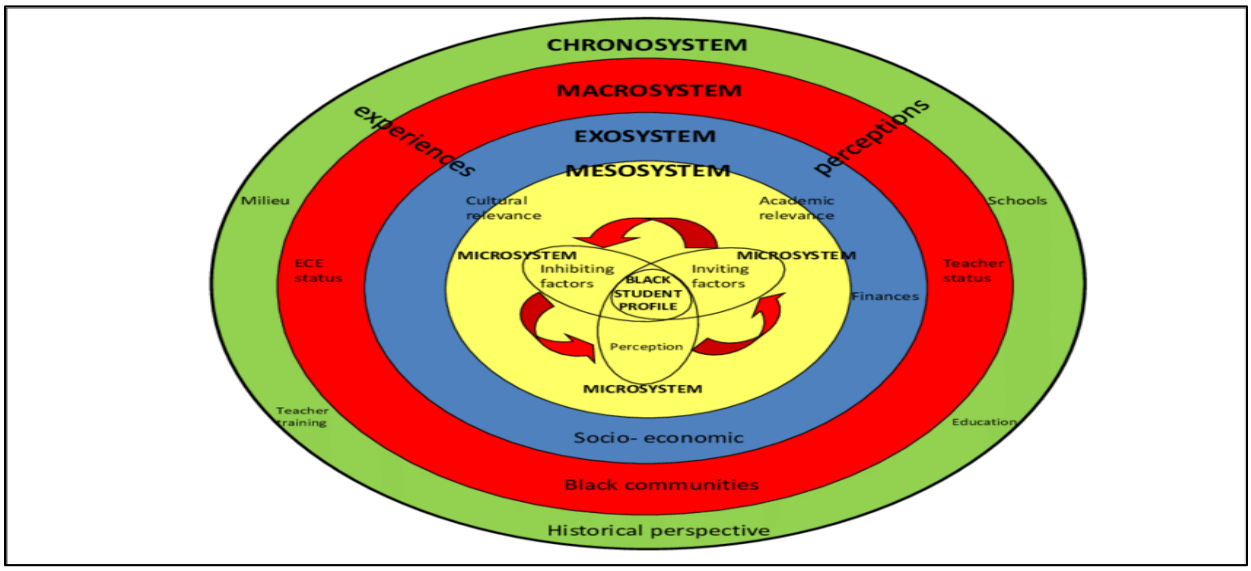

Fig 1: Bronfenbrenner's ecological model

Meanwhile, Berry's acculturation model categorizes how migrants adapt culturally. Although originally applied to cultural traits, we extend it to climate adaptation. Students may integrate by combining their original habits (spicy hot foods, social norms of collective dorm life) with host-country strategies (learning Russian greetings at winter markets). Alternatively, some may separate (minimizing interaction with locals and relying solely on co-nationals for weather advice), or assimilate (adopting Russian behaviors completely). Prior work shows that an integrative approach, maintaining one's cultural identity while engaging with host culture, leads to better psychological well-being (Zaidi et al. 2025). We anticipate that students who form friendships with local Russians or adopt familiar outdoor activities (like skiing or ice skating with classmates) will report smoother climate adaptation. These frameworks anchor our analysis: Bronfenbrenner highlights the contextual support and stressors at multiple levels, and Berry emphasizes individuals' orientation toward adaptation and how that orientation affects outcomes. Both suggest that strong social support and inclusive institutional practices foster resilience.

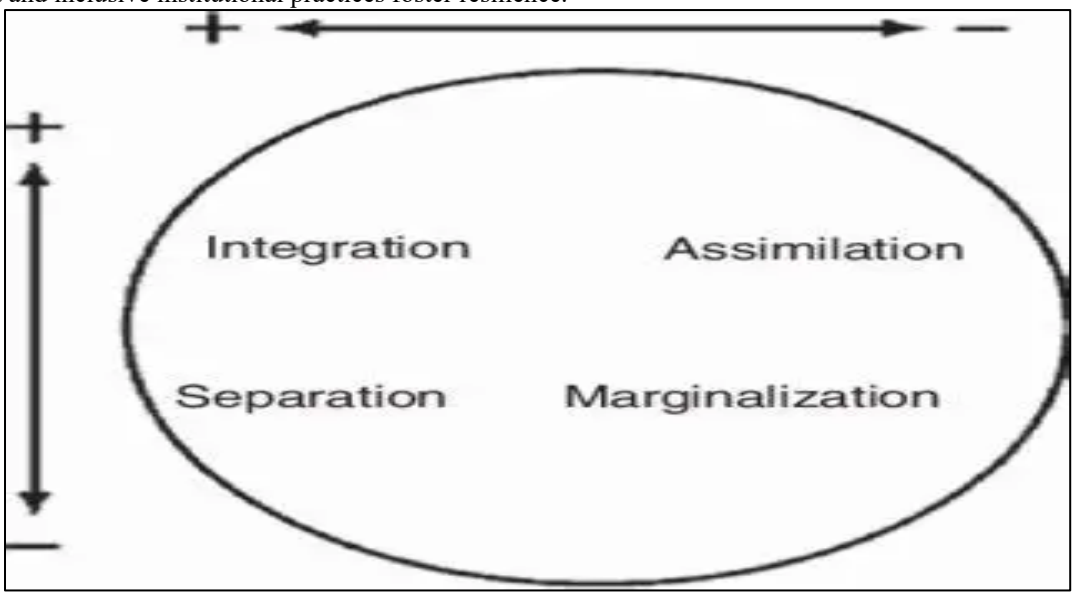

Fig 2: Berry's acculturation theory

3. METHODOLOGY

This study used a phenomenological qualitative design to capture students' personal experiences.14 participants (7 male, 7 female; aged 21–29) were recruited from warm-climate countries through purposive and snowball sampling via Moscow's international student networks. Students from different countries like Nigeria, Pakistan, Egypt, India, Bangladesh, Kenya, Ghana, Sudan, Sri Lanka, Brazil, Indonesia, Ethiopia, Philippines, and Saudi Arabia were

included. All had lived in Moscow for at least six months (range: 6–24 months) and were enrolled in Russian universities at various levels (bachelor's, master's, PhD). We ensured diversity in gender and region of origin to explore different perspectives (see Table 1 for demographics).

Interviews were semi-structured and conducted in English by the first author (a peer researcher familiar with the international student context). A topic guide covered initial climate impressions, physical health changes, emotional responses, coping strategies, and sources of support. Interviews lasted 45–75 minutes, held in informal settings (campus cafés or virtual meetings). Participants verbally consented and were assured confidentiality; interviews were audio-recorded and anonymized. This ethically conducted study adhered to the Helsinki Declaration through informed consent, confidentiality, minimal harm, and scientific integrity

Transcripts were analyzed using Braun and Clarke's six-phase thematic analysis. Two researchers independently coded transcripts, identifying patterns of meaning. Codes were iteratively organized into themes (e.g., "climate shock," "coping behaviors," "support networks"). We compared themes across participants to identify common experiences and unique cases. Reflexivity was maintained: the researchers (one local Russian, one recent international graduate) discussed biases and consulted with an external advisor to ensure credibility. Rich participant quotes support the themes, conveying authentic voices.

Table 1: Participant Demographics – Table 1 summarizes each participant's country, gender, age, study program, and time in Moscow.

Participant	Country	Gender	Age	Program	Time in Moscow
P1	**Nigeria**	Male	24	MSc	6 months
P2	**Pakistan**	Female	23	MSc	8 months
P3	**Egypt**	Male	27	PhD	18 months
P4	**India**	Female	22	BSc	9 months
P5	**Bangladesh**	Male	26	MSc	12 months
P6	**Kenya**	Female	25	MSc	12 months
P7	**Ghana**	Male	29	PhD	24 months
P8	**Sudan**	Female	24	MSc	18 months
P9	**Sri Lanka**	Male	28	MSc	6 months
P10	**Brazil**	Female	21	BSc	6 months
P11	**Indonesia**	Male	30	PhD	24 months
P12	**Ethiopia**	Female	25	MSc	10 months
P13	**Philippines**	Male	27	BSc	8 months
P14	**Saudi Arabia**	Female	23	BSc	9 months

Note: Duration is approximate.

TPM Vol. 32, No. S8, 2025
ISSN: 1972-6325
https://www.tpmap.org/

Open Access

Fig 3: Adaptation Strategies– Based on participants' reports and thematic analysis, we identified key coping strategies to extreme winter conditions

Table 2: Adaptation Strategies– Based on participants' reports and thematic analysis, we identified key coping strategies to extreme winter conditions (Table 2). These ranged from practical measures (clothing, diet) to psychosocial supports.

Strategy Category	Description / Examples
Thermal Clothing	Multi-layered apparel (thermal undergarments, insulated boots, heavy coats, scarves, hats). Example: "I bought a parka and wool socks; still my toes numb, but much better" (P5, Bangladesh).
Nutrition & Supplements	Vitamin D tablets, multivitamins, hot beverages (tea, soup), high-calorie diet to boost energy and warmth. Some took herbal infusions (ginger, honey) for cold symptoms.
Physical Activity	Indoor exercise (gym workouts, home routines), winter sports (skiing, ice-skating) to generate body heat. One student noted daily home workouts to combat lethargy: "When I feel low, I do 30 min workout; it warms me up and lifts mood."
Light Therapy & Rest	Use of daylight lamps or spending weekends in sunnier locations, and prioritizing good sleep hygiene to offset long winter nights. P12 (Ethiopia) got a light lamp: "After work, I sit near it for 30 min; I feel less sleepy during the dark evenings."
Social Support	Staying connected with family via video calls, gatherings with other international students, joining cultural clubs or local meetups. Peer friendships provided advice and companionship. "Having a Russian friend explain how to dress helped me immensely" (P2, Pakistan). Faith communities and student groups also offered emotional support.

Strategy Category	Description / Examples
Institutional Support	Utilizing university services: orientation sessions on winter life, counseling centers, and student associations. Peer mentor programs and workshops on winter safety were found helpful when available. Participants suggested that targeted pre-arrival briefings on climate would improve preparedness.
Emotional Coping	Maintaining positive mindset, humor ("we laugh about frostbite jokes"), keeping cultural traditions (cooking familiar foods) to feel "at home." Creative coping like celebrating new-year indoors or video-chatting during storms helped alleviate loneliness.

Each strategy reflects the microsystem (individual actions, peer networks) and mesosystem (institutional provisions) levels of Bronfenbrenner's model. Notably, social support emerged as a central theme: our findings resonate with research that robust support networks significantly reduce acculturative stress and improve international students' mental health. The next section presents detailed themes from participant narratives.

4. FINDINGS

4.1 Climate Shock and Physical Health Impacts

All participants described their first winter in Moscow as a shock. The initial exposure to snow, ice, and frigid air was universally "stupefying." P1 (Nigeria, M) said, "I stepped outside and the wind hit me like a wall; I had never felt air so cold – I shivered instantly." P10 (Brazil, F) recounted, "I felt pain in my bones the first week; it was so cold that even being indoors without a heater, I cried." These anecdotes illustrate acute cold stress. Common physical symptoms included joint aches, headaches, runny noses, dry skin, and rapid fatigue. Several participants noted their bodies' "very stiff reaction" (P3, Egypt) to low temperatures.

Many reported repeated colds and respiratory infections during the first winter. Without prior immunity to cold viruses common in temperate regions, five students fell ill with flu-like symptoms (fever, sore throat). Sleep disruption was also mentioned, especially by female students who felt over-heated at night despite cold ambient temperatures. These accounts align with biomedical research: abrupt cold exposure increases cardiovascular strain and can weaken immune defenses. As Wakabayashi et al. (2025) note, sustained cold requires thermoregulatory responses (shivering, vasoconstriction) to maintain homeostasis, which can itself cause fatigue.

Aside from illness, the reduced daylight of Moscow winter (sunset by 4 pm) led to mood-related effects. More than half of participants used the words "depressed," "sad," or "down" when describing December–January. P8 (Sudan, F) said "By January I was crying in class; I had never understood winter blues until I lived it." They described lethargy and irritability. This is consistent with winter-pattern Seasonal Affective Disorder (SAD), where lack of light and vitamin D can disrupt serotonin and melatonin, triggering depression symptoms. For example, several students began craving sweets and feeling sleepier, classic SAD signs. One male student (P7, Ghana) remarked, "When it got dark early, I wanted to sleep at 6pm; I felt hopeless for no reason." These observations match literature linking vitamin D deficiency and reduced sunlight to mood decline.

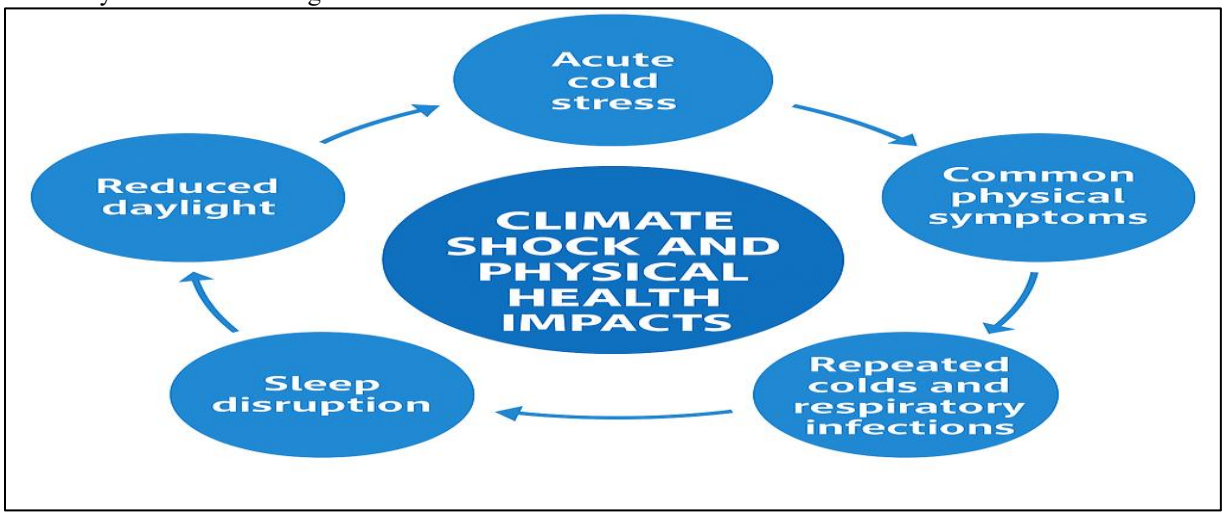

Fig 4: Climate Shock and Physical Health Impacts major factors

4.2 Gender and Cultural Challenges

Gender influenced experiences in specific ways. Female participants often expressed safety and cultural concerns about being outdoors in winter. P2 (Pakistan, F) said, "I worry about walking alone in heavy snow; it's slippery and I feel vulnerable, especially with the dress norms back home." Issues like more frequent colds during menstruation and hair care in dry heat were mentioned by several women. Some noted that winter made simple tasks like wearing a headscarf plus winter coat more cumbersome. In contrast, male participants more frequently reported physical shock phenomena (e.g. P9, Sri Lanka: "I felt my lungs hurt from the cold air, got a headache every morning from breathing fast in the cold").

Cross-cultural factors compounded these gendered experiences. Students from more collective societies (e.g. Sudan, Ghana, Sri Lanka) emphasized the emotional difficulty of isolation, whereas some from more individualistic cultures (e.g. Brazil, India) mentioned feeling empowered to actively find solutions. However, all agreed that language barriers often heightened stress: not knowing Russian terms for weather (e.g. howling winds, sleet) or climate warnings made preparation difficult. This linguistic isolation reflects acculturative stress, which contributes to poorer mental health. For example, P4 (India, F) said she avoided asking for help from locals due to shyness, exacerbating her sense of aloneness in the cold ("I just slept and ate, I didn't do much outside – I was too afraid to speak Russian to even buy socks.").

Despite these differences, both genders shared the challenge of unfamiliar winter culture. None had family in Moscow to turn to; some expressed a sense of lost cultural grounding ("back home winter is family gatherings and holidays; here it's just cold and nothing to celebrate," P12, Ethiopia, F). These findings suggest that in Berry's terms, students were largely experiencing stress from the new environment. However, those who adopted an integration strategy—seeking social ties in the host culture while maintaining personal routines—reported feeling more competent over time.

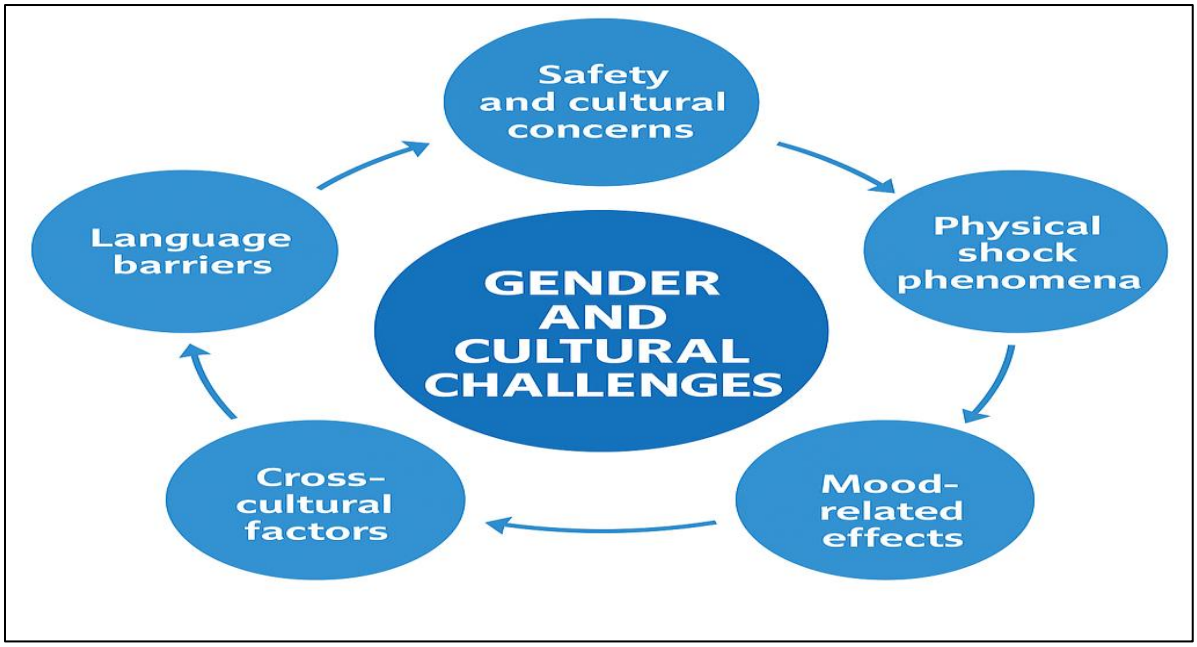

Fig 5: Gender and Cultural Challenges major elements

4.3 Coping Strategies and Support Systems

Participants identified multiple strategies to cope with cold stress. These strategies fell into behavioral, social, and cognitive domains, as summarized in Table 2. Common behavioral adaptations included investing in high-quality winter gear. Almost all bought layered clothing and thermal accessories upon arrival. P5 (Bangladesh, M) noted: "I went to a sports store and loaded up on winter coats; I even bought electric insoles for my shoes. It was expensive but necessary." Nutritional changes were also made: participants increased hot meals, soups, and vitamin supplements. Several explicitly took vitamin D and multivitamins daily, believing they helped "fill the gap" of missing sun. These actions align with biomedical recommendations for cold adaptation (maintaining warmth and adequate nutrition).

Physical activity was another coping mechanism. Most reported exercising indoors – joining gyms, yoga classes, or home workouts – which served dual purposes of warmth and stress relief. One participant said, "Moscow winters are brutal, but the gym's always warm. Still, I keep my thermal on when I run - that extra burn makes me feel alive. When I finally peel off that sweaty layer, it's like shedding all the city's cold and stress." Some joined winter outdoor activities with friends (ice skating, snowball fights) both to acclimate and socialize. These social activities provided emotional support: having fun in the snow helped reframe the environment positively.

Indeed, social support emerged as a critical factor. In line with prior research, participants who had friends or clubs found adaptation easier. P6 (Kenya, F) described joining the African Students Association, which organized a Christmas celebration with music and warm food. “That felt like home,” she said. Regular video calls with family also mitigated homesickness. The role of peers is supported by studies showing that strong networks reduce acculturative stress. In fact, one meta-analysis found that social support systems play a significant role in reducing acculturative stress among international students. Consistently, our students cited empathy and advice from others (older students, roommates, or even sympathetic Russian classmates) as indispensable.

Institutional and community support varied but was important when available. A few participants credited university orientations or international offices for helpful tips (e.g. advice to keep shoes outside, or explaining how Russian heating works). P9 (Sri Lanka, M) said a dormitory social event before winter helped him learn about preparing his room. Those who had access to culturally sensitive counseling or peer mentoring felt better equipped emotionally: “Our counselor spoke both English and Arabic; she understood my fears and gave me strategies,” noted P14 (Saudi Arabia, F). This echoes current guidelines that culturally tailored university programs and mental health initiatives enhance resilience.

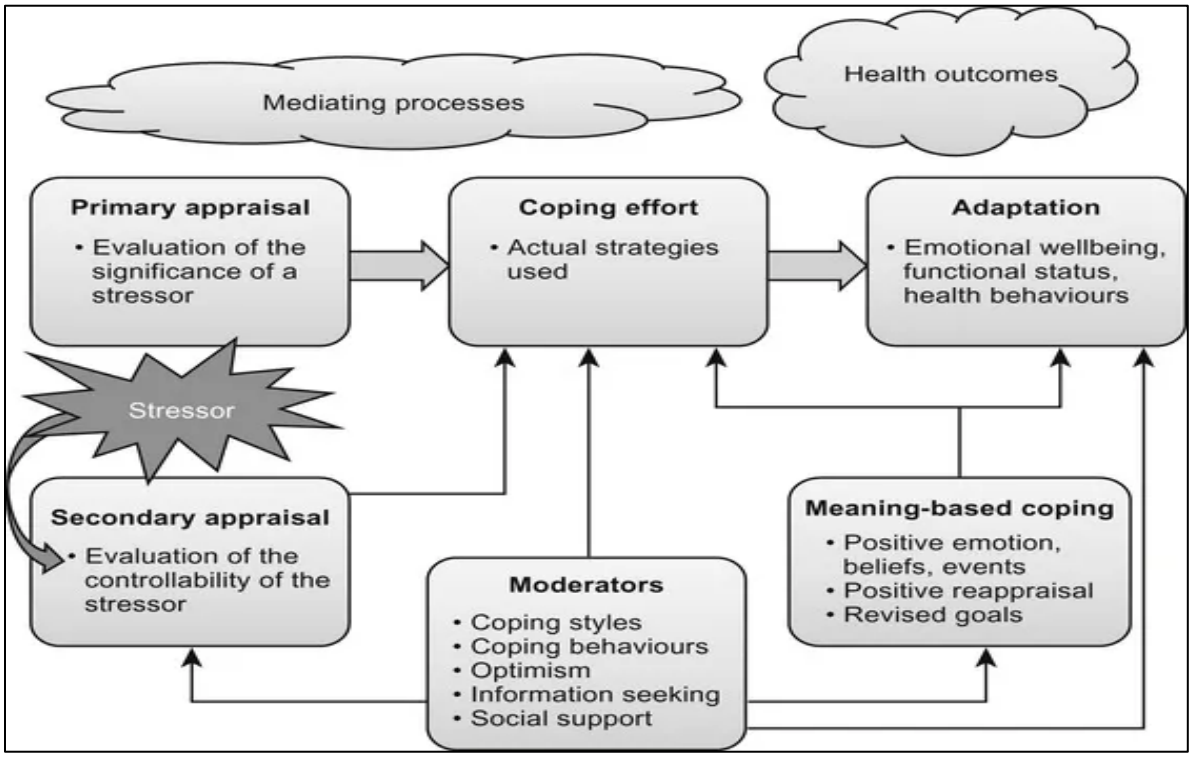

Fig 6: Coping Strategies and Support Systems

4.4 Acculturation and Integration

Using Berry’s framework, we observed that most participants adopted an integration-oriented acculturation: they maintained their own cultural practices (religion, cuisine, social habits) while gradually engaging Russian culture. For instance, participants learned to embrace local winter customs like drinking warm berry teas or attending a local winter festival. P3 (Egypt, M) described embracing Russian Christmas (Orthodox New Year) with Russian friends, which gave him a sense of inclusion. Conversely, a few remained more separated: sticking mainly to fellow countrymen and rarely venturing out, which corresponded to slower adaptation and greater stress.

Overall, the integration cases reported “feeling warmer in spirit” as much as physically. One Ghanaian woman (P7) said, “When my lab partner insisted we walk home together from campus in the snow, I didn’t feel as scared; I learned to joke about the cold.” This positive reframing aligns with Ansari Lari et al. (2025), who highlighted that social connectedness and self-care strategies (like humor) are key coping methods for students facing life transitions. In contrast, students who struggled with language or felt isolated tended to ruminate more on their discomfort, reinforcing negative feelings (“the weather is terrible” loop).

TPM Vol. 32, No. S8, 2025
ISSN: 1972-6325
https://www.tpmap.org/

Open Access

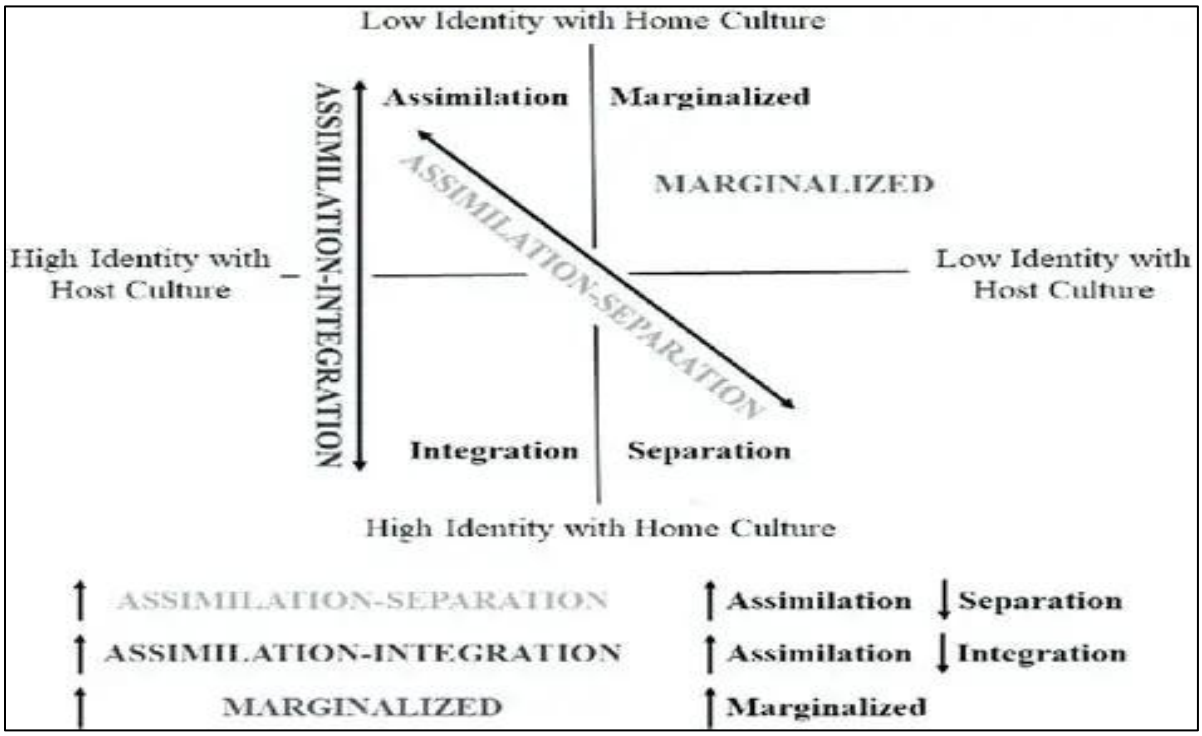

Fig 7: Berry's framework of Acculturation and Integration

5. DISCUSSION

This study illuminates how international students from warm climates confront a multi-faceted adaptation process in Moscow's extreme winter. The physical health impacts they report (joint pain, headaches, respiratory issues) are consistent with known physiological stressors of cold exposure (Farbu et al., 2019). Furthermore our findings confirm that students without prior acclimatization experience tangible health challenges. Importantly, these issues are not mere inconveniences; they can impede daily functioning and learning. Berry's theory suggests that stress in the new environment can hinder adaptation if not buffered by coping or support. Indeed, those with stronger social and institutional support (mesosystem level) coped better, underscoring Bronfenbrenner's view that overlapping support systems foster resilience (Garton et al, 2021).

The reported mental health effects (feelings of depression, lethargy) align with literature on SAD and acculturative stress. The meta-analysis by Soufi Amlashi et al. (2024) found acculturative stress strongly correlates with depression in international students, which our participants also exhibited (mood swings, withdrawal). The environmental dimension (extreme cold, darkness) adds a novel layer to acculturative stress, suggesting "climate shock" should be considered in student well-being models (Farbu et al., 2019). Participants' successful use of active coping (exercise, problem-solving) and social strategies echoes findings that seeking social support and maintaining positive thinking helps overcome depression (Carver et al., 1989). Conversely, those who experienced social isolation or language difficulties faced higher distress, consistent with Ansari Lari et al. (2025) who noted language and isolation are risk factors for mental strain.

Our emphasis on social and institutional support is backed by the emerging consensus: international students' resilience is greatly aided by connections and culturally sensitive services and also concluded social support significantly reduces acculturative stress (Ansari Lari et al, 2025). Within our data, students from collectivist cultures particularly valued group support. These findings have rights implications: universities have a responsibility to create inclusive environments (through peer mentoring, accessible counseling, clear communication) that fulfill students' right to health and safe learning. Tailored pre-arrival orientation (on clothing, local customs, available resources) could operationalize the preventive support advocated in the human rights–health literature (Smiley & Heisler, 2024).

Gender differences in our findings echo broader research on vulnerability: women often face more concerns about personal safety and social acceptance in foreign contexts (Logan & Walker, 2021). It suggests that adaptation programs should address these concerns explicitly (e.g. women-only travel groups, workshops on winter self-care). At the same time, male students' experiences remind us that physical coping techniques (fitness, skin care) also require guidance (Alsaleem et al., 2024).

Using an ecological-acculturation lens clarifies that adaptation is not an individual endeavor alone. It is shaped by multi-level factors: personal behavior (clothing, diet), immediate relationships (friends and family), institutional

practices (university support), and societal norms (Russian cold culture) (Ward & Geeraert, 2016). Our results support the integrative path of adaptation: students who blended new strategies with their own culture tended to report more positive adjustment (Berry et al., 2006). Berry's model suggests marginalization (neither engaging nor maintaining home culture) is least adaptive, which we indirectly observed in those who felt "lost" socially.

Finally, our study expands on Smiley and Heisler's (2024) call to view climate adaptation through a rights lens. Climate mobility affects students too; ensuring their safe adaptation to new environments is a part of equitable education. Institutions in cold regions should recognize that preparing international students for climate difference is as crucial as language or academic orientation.

6. CONCLUSION

International students from warm countries living in Moscow face a unique set of challenges in extreme winter climates. This study provides a comprehensive view of their physical discomforts, psychological strains, and adaptive responses. Key findings include widespread initial climate shock, prevalent cold-related health symptoms, high risk of low mood (SAD-like), and significant gendered experiences. However, these students also demonstrate resilience: practical coping strategies (warm clothing, supplements, activity), strong reliance on social ties, and institutional resources can mitigate stress. Notably, integration into the host culture (forming cross-cultural friendships and learning local customs) emerged as a facilitator of successful adaptation, consistent with Berry's theory of acculturation.

7. Research Implications

Universities must treat climate acclimatization as part of student support. This includes providing clear guidance on winter preparation, facilitating community-building, and ensuring mental health services are accessible and culturally sensitive. From a human rights perspective, these measures uphold students' right to health and equal educational opportunity regardless of origin.

Future research should quantitatively evaluate the health outcomes identified here (e.g. track incidence of winter illness or depression scales across semesters) and assess the effectiveness of specific interventions (like pre-departure training or light therapy programs). Comparative studies could examine differences between cold destinations (e.g. Moscow vs. Stockholm) and between student subgroups (undergraduate vs. postgraduate, ethnicity groups). Finally, exploring the long-term adaptation trajectory (including return to home environment) would address how climate experiences leave lasting effects.

8. Recommendations

Universities hosting students from warm regions should implement winter-adaptive orientation, encourage peer support systems, and partner with health services to monitor at-risk students during winter. Local communities and student groups can also play a role by organizing cultural-social events that provide warmth – literally and figuratively. By acknowledging and addressing the added "climate dimension" of acculturation, institutions can promote the well-being and rights of all students.

Funding: This research received no external funding, and all contributions were made solely by the authors.

Conflicts of Interest:We author have no conflicts of interest. Data Availability Statement: Data are available upon request to the corresponding author's e-mail address.

Acknowledgements: We are very grateful to all the teacher-friends who encouraged us to continue with the research work.

REFERENCES

1. Alsaleem, S. A., Al-qahtani, A. H., Al-qahtani, E. H., & AlKhaldi, Y. M. (2024). Stressors and coping strategies among secondary school male students in Abha City, Saudi Arabia. Frontiers in Psychology, 15, Article 1303721. https://doi.org/10.3389/fpsyg.2024.1303721

2. Ansari Lari, S., Zumot, M. S., & Fredericks, S. (2025). Navigating mental health challenges in international university students: adapting to life transitions. Frontiers in psychiatry, 16, 1574953. https://doi.org/10.3389/fpsyt.2025.1574953

3. Berry, J. W. (1997). Immigration, acculturation, and adaptation. Applied Psychology, 46(1), 5–34. https://doi.org/10.1111/j.1464-0597.1997.tb01087.x

4. Berry, J. W., Phinney, J. S., Sam, D. L., & Vedder, P. (2006). Immigrant youth: Acculturation, identity, and adaptation. Applied Psychology, 55(3), 303–332. https://doi.org/10.1111/j.1464-0597.2006.00256.x

5. Carver, C. S., Scheier, M. F., & Weintraub, J. K. (1989). Assessing coping strategies: A theoretically based approach. Journal of Personality and Social Psychology, 56(2), 267–283. https://doi.org/10.1037/0022-3514.56.2.267

6. Cianconi, P., Betrò, S., & Janiri, L. (2020). The impact of climate change on mental health. Frontiers in Psychiatry, 11, 74. https://doi.org/10.3389/fpsyt.2020.00074

7. Cold exposure and immune function. (1998). Canadian Journal of Physiology and Pharmacology, 76(9), 828–836. https://doi.org/10.1139/cjpp-76-9-828
8. Farbu, E. H., Skandfer, M., Nielsen, C., Brenn, T., Stubhaug, A., & Höper, A. C. (2019). Working in a cold environment, feeling cold at work and chronic pain: a cross-sectional analysis of the Tromsø Study. BMJ open, 9(11), e031248. https://doi.org/10.1136/bmjopen-2019-031248
9. Garton, P., Grimm, A., & Kim, S. (2021). Spanning Systems and Ecological Fluidity: A Revised Ecological Development Model for International Students. Journal of Comparative International Higher Education, https://doi.org/10.32674/jcihe.v13i5.2715
10. Kazi, D., Liu, C.-L., Al-Roub, N., Chaudhary, R., Kramer, D., Young, D., McNichol, M., Rice, M., Katznelson, E., Mickley, L., Cascio, W., & Bernstein, A. S. (2025). Climate change-fueled weather events linked to worsened heart health. JAMA Cardiology. https://hms.harvard.edu/news/climate-change-fueled-weather-events-linked-worsened-heart-health
11. Logan, T. K., & Walker, R. (2021). The gender safety gap: Examining the impact of victimization history, perceived
12. risk, and personal control. Journal of Interpersonal Violence, 36(3–4), NP1236–NP1260. https://doi.org/10.1177/0886260517729405
13. Mäkinen, T. M., Palinkas, L. A., Reeves, D. L., Pääkkönen, T., Rintamäki, H., Leppäluoto, J., & Hassi, J. (2006). Effect of repeated exposures to cold on cognitive performance in humans. Physiology & behavior, 87(1), 166–176. https://doi.org/10.1016/j.physbeh.2005.09.015
14. Nguyen, A.-M. D., & Benet-Martínez, V. (2013). Biculturalism and adjustment: A meta-analysis. Journal of Cross-Cultural Psychology, 44(1), 122–159. https://doi.org/10.1177/0022022111435097
15. Penckofer, S., Kouba, J., Wallis, D. E., & Emanuele, M. A. (2010). Vitamin D and depression: Where is all the sunshine? Issues in Mental Health Nursing, 31(6), 385–393. https://doi.org/10.3109/01612840903437657
16. Rai, A. G. (2025, May 7). Climate displacement can permanently hamper children's education and imperil future prospects. Migration Policy Institute. https://www.migrationpolicy.org/article/climate-displacement-education
17. Smiley, S., & Heisler, M. (2024). Climate adaptation and human rights: Potential directions for health advocacy and research. Health and Human Rights Journal, 26(1), 18–27. https://www.hhrjournal.org/2024/07/18/climate-adaptation-and-human-rights-potential-directions-for-health-advocacy-and-research/
18. Soufi Amlashi, R., Majzoobi, M., & Forstmeier, S. (2024). The relationship between acculturative stress and psychological outcomes in international students: A systematic review and meta-analysis. Frontiers in Psychology, 15, 1403807. https://doi.org/10.3389/fpsyg.2024.1403807
19. Tong, P., & An, I. S. (2024). Review of studies applying Bronfenbrenner's bioecological theory in international and intercultural education research. Frontiers in psychology, 14, 1233925. https://doi.org/10.3389/fpsyg.2023.1233925
20. Ward, C., & Geeraert, N. (2016). Advancing acculturation theory and research: The acculturation process in its ecological context. Current Opinion in Psychology, 8, 98–104. https://doi.org/10.1016/j.copsyc.2015.09.021
21. Wakabayashi, H., Sakaue, H., & Nishimura, T. (2025). Recent updates on cold adaptation in population and laboratory studies, including cross-adaptation with nonthermal factors. Journal of Physiological Anthropology, 44(1), Article 7. https://doi.org/10.1186/s40101-025-00387-6
22. Zaidi, S. G. S., Zahra, S. K., Zaidi, S. Z. R., Aun, S. M., & Zeeshan. (2025). A qualitative study on the effects of homesickness on mental health and sleep among newly admitted students residing in hostels in public universities of Punjab, Pakistan. Journal of Health and Rehabilitation Research, 5(2), 1–6. https://doi.org/10.61919/jhrr.v5i2.1760