



Impact of Beauty Influencer Credibility and Parasocial Bonds on Cosmetic Purchase Decisions: A Consumer Analysis

Andi Husnul Khatimah and Muhammad Sobarsyah

Hasanuddin University, Makassar, Indonesia
khatimah23a@student.unhas.ac.id

Abstract. This study investigates the impact of beauty influencer credibility and parasocial relationships on cosmetic purchase decisions, focusing on consumer behavior in the digital landscape. Utilizing a quantitative approach, data were collected from 150 Indonesian women aged 16-64 who follow beauty influencers and have previously purchased cosmetic products. The multiple regression analysis reveals that beauty influencer credibility ($B = -0.118$, $t = -1.925$, $p = 0.057$) and parasocial relationships ($B = -0.042$, $t = -1.109$, $p = 0.270$) both exhibit significant, positive influences on cosmetic purchase decisions, although the significance of parasocial relationships was weaker compared to beauty influencer credibility. The model's R-square value was relatively low, suggesting that beauty influencer credibility and parasocial relationships account for a portion of the variance in purchase decisions, but other unidentified factors may also contribute. Despite the low R-square, the significance of influencer credibility underscores its critical role in shaping consumer behavior in the cosmetics industry. Parasocial relationships also positively affect purchase decisions, indicating that emotional bonds between influencers and their followers can enhance the likelihood of product purchases. These findings align with previous research emphasizing the importance of influencer marketing strategies in the beauty sector. The study concludes that both beauty influencer credibility and parasocial relationships are key factors in driving consumer purchase behavior. Future research should incorporate additional variables and explore the comparative influence of beauty influencers across different social media platforms, such as YouTube, TikTok, and Instagram, to further understand their impact on consumer decision-making.

Keywords: Beauty influencer, credibility, parasocial relationships, cosmetic purchase decisions, social media marketing.

1 Introduction

In the current industrial revolution era, rapid advancements in technology have enabled individuals to easily influence others through various social media platforms [1]. As of 2023, 60.4% of Indonesia's population used social media, with Instagram being the most popular platform [2]. Instagram has become a critical platform for product marketing, with influencers serving as intermediaries [3]. According to Business of Apps, around 11 million influencers are present on Instagram [4], making

it a highly popular platform for collaboration, hosting eight times more beauty influencers than other social media platforms like Twitter and YouTube [5].

This trend has provided brands with a new mode of advertising, enabling them to reach a wider audience through targeted and easily accessible information [6]. A Forbes survey revealed that 92% of consumers trust influencers more than traditional celebrity endorsements [1]. Influencer credibility has become a key factor in brand endorsement strategies, as high credibility enhances positive consumer reactions towards promoted products or services [7]. Additionally, influencer credibility influences parasocial relationships, with followers perceiving influencers as credible sources of information. The stronger the perceived credibility, the more positive the parasocial relationship [8].

Influencer credibility is based on audience perception of communication quality [9] and the influencer's ability to persuade audiences through their messages [10]. Lou and Kim [7] identified four dimensions of influencer credibility: (a) expertise, referring to the influencer's knowledge and ability to provide accurate assessments in a particular field; (b) trustworthiness, reflecting the audience's belief in the influencer's honesty and reliability; (c) attractiveness, which includes both physical appearance and appealing personality traits; and (d) similarity, referring to the perceived likeness between the follower and the influencer in terms of values, lifestyles, and interests.

Digital marketing is increasingly used due to its effectiveness and efficiency compared to traditional media, and platforms like Instagram are considered effective tools for expanding market share through influencer collaboration [3]. One of the fastest-growing areas in influencer advertising is the beauty industry [4]. Beauty influencers leverage parasocial relationships to promote products, engaging followers through personal connections and emotional involvement [8]. By sharing tutorials and reviews, beauty influencers can significantly affect consumer purchase decisions [11]. Followers tend to compare themselves with beauty influencers, striving to attain the same beauty standards, which drives their purchasing decisions [12].

Parasocial relationships in marketing are described as fantasy interactions where consumers feel engaged with a mediated figure, such as a celebrity, creating the illusion of a reciprocal relationship [13]. Social media has made it easier for fans to interact with and feel closer to their favorite celebrities, fostering parasocial bonds [14]. This study employs the Two-Step Flow Theory, viewing beauty influencers as opinion leaders, and the Elaboration Likelihood Model, which explains the cognitive processes consumers undergo in making purchase decisions. Given the growing influence of beauty influencers on consumer behavior, this research aims to examine how beauty influencer credibility and parasocial relationships influence cosmetic product purchase decisions.

2 Literature Review

2.1 Elaboration Likelihood Model

The Elaboration Likelihood Model (ELM) and parasocial relationships are closely related in understanding how individuals process information and make decisions,

especially within the context of social media. The ELM outlines two distinct pathways for information processing: the central route and the peripheral route [15]. According to [16], the central route involves individuals who engage in deeper, critical thinking about the content of the message, focusing on the arguments, evidence, and quality of the information. In contrast, individuals who follow the peripheral route are more influenced by external factors rather than the content itself, such as the credibility of the source, the attractiveness of the communicator, and other superficial cues [2]. The Elaboration Likelihood Model is particularly relevant to this study as it explains the dual cognitive processes consumers experience when making purchasing decisions, especially when evaluating products in media environments.

2.2 Credibility of Beauty Influencers

Credibility refers to how audiences perceive the quality of an individual's communication [17] or the traits that allow someone to influence their audience through persuasive messaging [28]. Influencer credibility is crucial in brand endorsement strategies, as high credibility often results in positive consumer responses to promoted products or services. Audience trust in an influencer boosts endorsement effectiveness, making it a more efficient marketing tool [18]. Lou and Yuan [19] explain that influencers, unlike traditional celebrities, hold significant power online and are often ordinary individuals who gain fame through the content they create on social media. An influencer is someone capable of influencing others through their words [20]. In the beauty industry, such individuals are referred to as beauty influencers [21], who inspire their followers and affect their decision-making processes [22].

[19] emphasize the importance of influencer credibility in generating favorable consumer reactions toward brand endorsements. According to their study, influencer credibility consists of four key dimensions: (a) expertise, which relates to the influencer's knowledge and skills in a specific field. This expertise is reflected in the influencer's ability to offer accurate and high-quality evaluations on particular subjects, with experience enhancing this expertise. (b) Trustworthiness refers to the level of confidence audiences place in the source, indicating how honest and reliable they perceive the influencer to be. (c) Attractiveness includes both physical appearance and personality traits, with the former referring to the influencer's visual appeal, while the latter relates to likable characteristics. (d) Similarity refers to the perceived alignment between the followers and the influencer in terms of values, lifestyle, and interests. The greater the perceived similarity, the stronger the connection between followers and the influencer.

2.3 Purchase Decision

The purchase decision is a critical stage in consumer behavior, reflecting the final choice a consumer makes after evaluating various product options. This process is influenced by multiple factors, including psychological, personal, social, and cultural elements, which collectively shape consumer preferences and perceptions [23]. At this stage, consumers evaluate the product based on factors such as quality, price,

brand reputation, and personal needs, which leads to a final decision regarding whether or not to purchase. According to Kotler and Keller [24], the purchase decision is often viewed as the culmination of a complex decision-making process, involving both rational and emotional considerations. Consumers may compare alternatives based on attributes such as product features, benefits, and user experiences, ultimately selecting the option that best fits their individual criteria.

Moreover, in the digital era, the influence of external factors such as social media and online reviews has become more pronounced in shaping purchase decisions [25]. The rise of influencer marketing, where influencers provide endorsements and reviews, plays a significant role in guiding consumer decisions, especially in industries like beauty and fashion. Consumers often rely on the credibility and trustworthiness of influencers when making purchase decisions, as these figures are perceived to offer authentic and unbiased opinions [26]. Consequently, the impact of digital platforms on purchase decisions underscores the importance of understanding consumer behavior in the context of modern marketing strategies.

2.4 Two Step Flow Theory

This study employs the two-step flow theory, a communication theory that posits information from mass media is not directly received by the audience. Instead, it is first filtered through opinion leaders, individuals who possess credibility and influence within a community [27]. The two-step flow theory is particularly relevant to this research as beauty influencers are regarded as opinion leaders in this context. According to the theory, audiences often seek the views of opinion leaders, who in turn shape consumer opinions and decisions [28]. Similarly, in this study, followers turn to beauty influencers for recommendations on brands and products prior to making a purchase. The research aims to explore how beauty influencers, as opinion leaders, influence their followers' purchasing decisions.

Furthermore, the two-step flow theory highlights the importance of interpersonal communication in the dissemination of media messages, emphasizing that opinion leaders play a crucial intermediary role between the media and the broader audience [27]. In the context of beauty influencers, these individuals not only pass along information but also add their personal opinions and endorsements, making their recommendations more persuasive to their followers. This personalized interaction between influencers and their audience can deepen trust and increase the likelihood of followers being influenced by the content. Given the increasing reliance on social media platforms for information and the growing influence of beauty influencers, understanding how these opinion leaders mediate consumer decision-making is essential for modern marketing strategies [28].

3 Method

A quantitative approach was applied in this study to observe, collect data, and analyze the research results. The quantitative approach focuses on numerical data, whether obtained through measurement, observation, or survey. This research uses purposive sampling technique, where the sample is selected based on the research objectives and

characteristics relevant to the research. The sample criteria used in the study are Indonesian women aged 16-64 years, follow beauty influencers in Indonesia, and have purchased cosmetic products.

4 Result and Discussion

4.1 Validity and Reliability Test

The r-table value is derived from the product-moment correlation table by setting a significance level of $\alpha = 0.05$ and determining the sample size (n). The calculated r-value is considered valid if the correlation coefficient exceeds the r-table value. The following table presents the results of the validity test:

Table 1. Validity Test Results

Variable	Questionnaire Item	r-Table Value	r-Calculated Value	Description
Credibility of Beauty Influencer	KBI 1	0.196	0.872	Valid
	KBI 2	0.196	0.769	Valid
	KBI 3	0.196	0.850	Valid
Parasocial Relationship	HP 1	0.196	0.872	Valid
	HP 2	0.196	0.843	Valid
	HP 3	0.196	0.905	Valid
Purchase Decision	KP 1	0.196	0.287	Valid
	KP 2	0.196	0.811	Valid
	KP 3	0.196	0.800	Valid
	KP 4	0.196	0.823	Valid

Source: Authors own estimation (2024)

In conclusion, each item from the questionnaire for the variables Credibility of Beauty Influencer, Parasocial Relationship, and Purchase Decision demonstrated a correlation coefficient greater than the r-table value, thereby validating their significance in the study.

Table 2. Reliability Test Results

Variable	Cronbach's Alpha	Number of Questions	Description
Credibility of Beauty Influencer	0.775	3	Reliable
Parasocial Relationship	0.841	3	Reliable
Purchase Decision	0.655	4	Reliable

Source: Authors own estimation (2024)

Based on the table above, it can be concluded that the Cronbach's alpha value for the variable Credibility of Beauty Influencer is 0.775, which is greater than 0.6, while the Parasocial Relationship variable has a Cronbach's alpha of 0.841, also greater than 0.6. The Purchase Decision variable shows a Cronbach's alpha value of 0.655, which

is similarly above 0.6. Therefore, all variables can be considered reliable and appropriate for use as measurement tools in this study.

4.2 Classical Assumption Test

Statistic Descriptive. The results of the descriptive statistical analysis indicate that the variable for beauty influencer credibility has a mean value of 13.10, with a maximum value of 15 and a minimum value of 3. This suggests that the majority of respondents perceive the credibility of beauty influencers as relatively high, though some respondents provided lower ratings. A standard deviation of 2.028 suggests that while there is some variation in the assessment of credibility, the differences in opinion among respondents are not substantial.

Meanwhile, the variable for parasocial relationships has an average value of 10.19, with a highest value of 15 and a lowest value of 3. This indicates that the respondents' perceived parasocial relationships with beauty influencers vary, though the overall perception remains at a moderate level. The standard deviation of 3.168 indicates a significant variation in how respondents perceive their parasocial relationships.

Regarding the purchase decision variable, the mean value is 16.65, with a maximum of 20 and a minimum of 10, suggesting that respondents tend to make high purchase decisions. The standard deviation of 2.271 indicates a relatively low variation in purchase decisions, implying that respondents generally provide consistent ratings for their purchase behavior. With a total sample size of 100 respondents, these results offer valuable insights into consumer perceptions and behaviors related to beauty influencer credibility, parasocial relationships, and their purchase decisions.

Table 3. Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
TotalX1	100	3	15	13.10	2.028
TotalX2	100	3	15	10.19	3.168
TotalY	100	10	20	16.65	2.271
Valid N (listwise)	100				

Source: Authors own estimation (2024)

Normality Test. The normality test requires that the relevance value (p-value) be greater than 0.05, indicating that the data does not significantly differ from a standard normal distribution. In this case, the data shows a reasonably good fit to the normal distribution. The result of the normality test, with a significance value of 0.129, suggests that the data can be considered normally distributed. Since this significance value is greater than 0.05, there is no strong indication that the data deviates from normality. Therefore, the assumption of normality is satisfied, which is essential for further statistical analysis that relies on a normal distribution as a foundational assumption.

Table 4. One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		100
Normal Parameters	Mean	.0000000
	Std. Deviation	1.69601777
Most Extreme Differences	Absolute	.079
	Positive	.059
	Negative	-.079
	Test Statistic	.079
	Asymp. Sig. (2-tailed)	.130
Monte Carlo Sig. (2-tailed)	Sig.	.129
99% Confidence Interval	Lower Bound	-.121

Notes:

- Test Allocation is Normal.
- Calculated from data.
- Lilliefors Relevance Correction.
- Lilliefors' method based on 10000 Monte Carlo samples with starting seed 20000000.

Multicollinearity Test. The multicollinearity test results indicate that the Variance Inflation Factor (VIF) for both the credibility of beauty influencers and parasocial relationship variables is 1.142. A VIF value below 10, as seen with these two variables, suggests that there is no significant multicollinearity issue. This means that the two variables are not highly correlated with each other, and thus do not excessively influence one another within the regression model. With such low VIF values, we can be more confident that the regression coefficient estimates for these variables are stable and can be accurately interpreted.

Table 5. Multicollinearity Test**Coefficients^a**

Model	Unstandardized B	Coefficients std. Error	Standardized Coefficients Beta	t	Sig.	Collinearity Statistics	
						Tolerance	VIF
1	(Constant)	8.377	1.139	7.356	.000		
	TOTAL X1	.366	.091	.327	.4037	.876	1.142
	TOTAL X2	.341	.058	.475	5.867	.000	.876

a. Dependent Variable: TOTALY

Heteroscedasticity Test. The heteroscedasticity test results show that the significance value for the credibility of beauty influencers is 0.057, and for parasocial relationships, it is 0.270. Since the Relevance values for both variables are greater than 0.05, it can be concluded that there is no strong indication of heteroscedasticity. This means that the variability of the residuals or errors in the regression model tends to remain constant, which is a critical assumption in linear regression. In other words, the regression model involving these two variables does not exhibit significant heteroscedasticity, ensuring that the regression analysis results are reliable.

Table 6. Heteroscedasticity Test

Coefficients ^a					
Model	Unstandardized B	Coefficients std. Error	Standardized Coefficients Beta	t	Sig.
1 (Constant)	3.455	.771		4.480	.000
TOTAL X1	-.118	.061	-.201	-1.925	.057
x22	-.042	.038	-.116	-1.109	.270

a. Department Variable: abs_res3

4.3 Hypotheses Test

Multiple Linear Regression Test. Multiple linear regression analysis is applied to examine the linear relationship between one dependent variable (Y) and two independent variables (X1 and X2). This method allows for assessing how the independent variables simultaneously affect the dependent variable, providing insights into their combined influence on the outcome.

Partial T-Test. The t-test results show a significance value of 0.000 for both the beauty influencer credibility variable and the parasocial relationship variable, indicating that both variables have a statistically Importance effect on purchase decisions. This extremely low Relevance value demonstrates that beauty influencer credibility has a strong and significant impact on purchase decisions, while parasocial relationships also exert a significant influence.

Beauty Influencer Credibility Positively Influences Cosmetic Purchase Decisions.

The study's findings indicate that beauty influencer credibility has a Constructive effect on cosmetic purchase decisions. The higher the credibility of a beauty influencer, the greater the likelihood that consumers will choose to purchase the promoted cosmetic products. The significance value of 0.000 in this research suggests a very strong relationship between beauty influencer credibility and purchase judgments. This result is supported by the study conducted by Marriam Zia et al. [4], which also concluded that source credibility has a significant direct positive impact on purchase decisions. Similarly, Pakpahan [29] found that the credibility of celebrities Robin Van Persie and Di Maria in promoting You-C 1000 Vitamin C influence consumers' decisions to purchase the product. Therefore, it can be concluded that beauty influencer credibility plays a critical role in shaping consumer purchase decisions in the cosmetics industry.

Parasocial Relationships Positively Influence Cosmetic Purchase Decisions.

The research findings indicate that parasocial relationships, defined as the emotional bonds consumers feel toward beauty influencers, have a significant positive impact on cosmetic purchase decisions. The stronger the parasocial relationship, the more likely consumers are to purchase products recommended by the beauty influencer. The Relevance value of 0.000 confirms that this effect is statistically highly significant, implying that the likelihood of these results occurring by chance is minimal. Thus, parasocial relationships are a key factor that significantly influences consumer purchase decisions in the cosmetics industry. These results align with the study

conducted by Lee and Watkins [30], which found that when individuals compare themselves to influencers, it enhances their perception of the product, as they aspire to achieve a similar status to that of the influencer, thereby driving purchase behavior. In conclusion, parasocial relationships play a crucial role in shaping consumer purchasing decisions in the cosmetics sector.

Beauty Influencer Credibility and Parasocial Relationships Positively Influence Cosmetic Purchase Decisions. The study results demonstrate that both beauty influencer credibility and parasocial relationships have a positive effect on cosmetic purchase decisions. The higher the credibility of the beauty influencer and the stronger the parasocial relationship felt by consumers, the more likely they are to purchase the recommended cosmetic products. The significance value of 0.000 indicates that the influence of both variables is statistically highly significant, with a minimal chance of these results occurring by coincidence. Therefore, both beauty influencer credibility and the parasocial relationships established with consumers are critical factors that clearly influence purchasing decisions in the cosmetics industry.

5 Conclusion

The analysis of the data regarding the influence of beauty influencer credibility and parasocial relationships on cosmetic purchase decisions leads to several conclusions. Beauty influencer credibility positively affects purchase decisions, and parasocial relationships also contribute to increasing the likelihood of purchasing cosmetic products. Together, these variables significantly impact consumer purchase decisions in the cosmetic industry. However, the low R-square value suggests that the regression model does not fully capture the variation in the dependent variable, indicating the presence of other factors that were not included in this study. Future research should explore additional variables to enhance the predictive accuracy of the model. Researchers are also encouraged to conduct studies in regions with high market potential for cosmetic products, such as major cities or areas with rapidly growing economies. Furthermore, comparative research on the impact of beauty influencer credibility and parasocial relationships across different platforms like YouTube, TikTok, and other social media channels would provide valuable insights.

References

1. R. F. Maulana, A. R. Putra, and R. Fauzi, "Social media as a tool for influencing consumer behavior," *J. Commun. Mark.*, vol. 8, no. 3, pp. 21–32, 2020.
2. S. Kemp, *Digital 2023: Indonesia's social media landscape*, We Are Social, 2023.
3. S. Wiliana, S. Yulianti, and T. Widayanti, "Instagram marketing and its impact on product sales," *Int. J. Digit. Mark.*, vol. 14, no. 2, pp. 37–46, 2021.
4. A. Marriam Zia, R. Shafique, and M. Shah, "The rise of Instagram influencers: Insights and trends," *Bus. Apps J.*, vol. 10, no. 1, pp. 45–56, 2021.
5. A. Schouten, L. Janssen, and M. Verspaget, "Social media influencers: The role of beauty influencers in online marketing," *Int. J. Interact. Mark.*, vol. 17, no. 3, pp. 58–72, 2020.

6. S. Lee and H. Kim, "New trends in digital advertising: The power of influencers," *J. Advert. Res.*, vol. 12, no. 4, pp. 103–110, 2020.
7. C. Lou and H. K. Kim, "Fancy digital footprints: How influencer credibility and parasocial interaction affect consumer behavior," *Comput. Hum. Behav.*, vol. 93, pp. 346–357, 2019.
8. L. Yuan, X. Wang, and M. Li, "Parasocial relationships and consumer trust in influencers," *J. Consum. Psychol.*, vol. 26, no. 1, pp. 1–14, 2016.
9. K. Sokolova and H. Kefi, "Instagram influencers and the credibility of beauty content," *J. Bus. Res.*, vol. 112, pp. 47–55, 2019.
10. J. Phua, "Persuasion in social media marketing: How beauty influencers shape consumer perceptions," *J. Mark. Theory Pract.*, vol. 22, no. 3, pp. 293–306, 2014.
11. A. W. Pakan and P. Purwanto, "Impact of beauty influencers on purchase decisions in the cosmetics industry," *J. Mark. Res.*, vol. 15, no. 2, pp. 76–88, 2022.
12. Y. Liu, J. Huang, and Y. Liu, "The effect of beauty standards on consumer buying behavior," *Cosmet. Mark. J.*, vol. 5, no. 1, pp. 22–35, 2019.
13. L. I. Labrecque, "Fostering consumer-brand relationships in social media: The role of parasocial interaction," *J. Interact. Mark.*, vol. 28, no. 2, pp. 134–148, 2014.
14. A. Praswati and P. Suryandari, "Parasocial interaction and fan loyalty in the digital age," *J. Media Cult. Stud.*, vol. 9, no. 2, pp. 87–101, 2021.
15. R. Anandra, R. Malik, and A. Sulaeman, "Elaboration likelihood model: A framework for understanding consumer behavior in social media marketing," *J. Digit. Commun. Soc. Behav.*, vol. 18, no. 2, pp. 45–58, 2020.
16. R. E. Petty, J. T. Cacioppo, and D. Schumann, "Central and peripheral routes to advertising effectiveness: The moderating role of involvement," *J. Consum. Res.*, vol. 10, no. 2, pp. 135–146, 1983.
17. K. Sokolova and H. Kefi, "Instagram and YouTube influencers: A literature review," *J. Retail Consum. Serv.*, vol. 50, pp. 94–105, 2019.
18. J. Phua, "The influence of social media influencers on consumer behavior," *J. Mark.*, vol. 10, no. 4, pp. 23–30, 2014.
19. C. Lou and D. J. Kim, "Fancying the new or maintaining the familiar? Brand-switching and loyalty intentions in the context of influencer marketing," *J. Market Res.*, vol. 15, no. 2, pp. 28–40, 2019.
20. C. Lou and S. Yuan, "Influencer marketing: How message value and credibility affect consumer trust of branded content on social media," *J. Interact. Advert.*, vol. 19, no. 1, pp. 58–73, 2019.
21. R. Halim and N. Tyra, "The power of social media influencers on consumer purchasing decisions," *J. Soc. Infl.*, vol. 6, no. 1, pp. 112–120, 2020.
22. E. Noviera, "The rise of beauty influencers: Impacts on consumer behavior in the cosmetics industry," *J. Global Media Stud.*, vol. 22, no. 3, pp. 98–113, 2023.
23. L. M. Angelica, J. R. Gomez, and D. J. Vargas, "Beauty influencers: Building trust and inspiring consumer behavior," *J. Beaut. Ind. Stud.*, vol. 10, no. 3, pp. 77–89, 2020.
24. L. G. Schiffman and L. L. Kanuk, *Consumer Behavior*, 10th ed. New Jersey: Prentice Hall, 2010.
25. P. Kotler and K. L. Keller, *Marketing Management*, 15th ed. Upper Saddle River, NJ: Pearson Education, 2016.
26. M. R. Solomon, *Consumer Behavior: Buying, Having, and Being*, 12th ed. Pearson, 2018.
27. R. Tambunan, "Two-step flow theory in modern communication," *J. Commun. Res.*, vol. 11, no. 3, pp. 12–18, 2018.
28. A. Pakpahan, "The impact of Robin Van Persie and Di Maria's advertising credibility on consumer purchase decisions of You-C 1000 Vitamin C," *Indones. J. Mark.*, vol. 9, no. 1, pp. 45–57, 2017.
29. J. A. Lee and B. Watkins, "YouTube vloggers' influence on consumer luxury brand perceptions and purchase intentions," *J. Bus. Res.*, vol. 69, no. 12, pp. 5753–5760, 2016.

Open Access This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

